PB-230 749

POLLUTION OF THE INTERSTATE WATERS OF THE ESCAMBIA RIVER BASIN (ALABAMA-FLORIDA) AND THE INTRASTATE PORTIONS OF THE ESCAMBIA BASIN WITHIN THE STATE OF FLORIDA. THIRD SESSION, HELD AT GULF BREEZE, FLORIDA ON JANUARY 24-26, 1972. TRANSCRIPT OF PROCEEDINGS

Environmental Protection Agency
Washington, D. C.

1972

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PB 230 749

THIRD SESSION

OF

CONFERENCE

IN THE MATTER OF

POLLUTION OF THE INTERSTATE WATERS OF ESCAMBIA RIVER BASIN AND THE INTRASTATE PORTIONS OF THE ESCAMBIA BASIN AND BAY WITHIN THE STATE OF FLORIDA

held at

Gulf Breeze, Florida

January 24-26, 1972

TRANSCRIPT OF PROCEEDINGS

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The third session of the conference in the matter of pollution of the interstate waters of Escambia River Basin and the intrastate portions of the Escambia Basin and Bay within the State of Florida convened at 9:30 o'clock on January 24, 1972, at the Holiday Inn, Gulf Breeze, Florida.

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PROCEEDINGS

OPENING STATEMENT

BY

MR. JOHN C. WHITE

MR. WHITE: The conference is open.

This Third Session of the Conference in the Matter of Pollution of the Interstate Waters of Escambia River Basin and the Intrastate Portions of the Escambia Basin and Bay within the State of Florida is being held under the provisions of Section 10 of the Federal Water Pollution Control Act as amended.

Under the provisions of the Act, the Administrator of the Environmental Protection Agency is authorized to call a conference of this type when requested to do so by the Governor of a State. On the basis of a written request from the Honorable Reubin Askew, Governor of Florida, dated October 19, 1971, this third conference has been called to consider progress in the abatement of pollution in the interstate and navigable waters of the Escambia River Basin and Bay. The first conference was held January 20 and 21, 1970, in Gulf Breeze, Florida. The second conference was held February 23 and 24, 1971, in Pensacola.

As specified in Section 10 of the Act, the Florida Department of Pollution Control and the Alabama Water Improvement

Commission have been notified of this reconvened conference.

Both the State and Federal Governments have responsibilities in dealing with water pollution control problems. The Federal Water Pollution Control Act declares that the States have primary rights and responsibilities for taking action to abate and control pollution.

At the same time, the Administrator of the Environmental Protection Agency is charged by law with specific responsibilities in the field of water pollution control in connection with pollution of interstate and navigable waters. The Federal Water Pollution Control Act provides that pollution of interstate or navigable waters which endangers the health or welfare of any persons shall be subject to abatement. This applies whether the matter causing or contributing to the pollution is discharged directly into such waters or reaches such waters after discharge into a tributary.

The purpose of the conference is to bring together the State water pollution control agencies, representatives of the Environmental Protection Agency, and other interested parties to review the existing situation and the progress which has been made, to lay a basis for future action by all parties concerned, and to give the State, localities and industries an opportunity to take any indicated remedial action under the

State and local law.

The Florida Department of Pollution Control will be represented by Mr. David Levin and his designee, Mr. Gil Mauriello.

The Alabama Water Improvement Commission will be represented by Mr. Joe Crockett.

The Federal conferees are Mr. Jack E. Ravan, Regional Administrator of the EPA's Southeast Region, and Mr. Paul Traina, who is Acting Director of the Water Programs Branch, Southeast Region, Environmental Protection Agency.

I am John C. White, Director of the Enforcement Division. I am from the Atlanta Regional Office and I have been designated Chairman by Mr. Ruckelshaus.

The parties to this conference are the official State water pollution control agencies and the EPA. Participation in the conference will be open to representatives and invitees of these agencies and such persons as inform me they wish to present a statement. However, only the representatives of the Florida Department of Pollution Control and the Alabama Water Improvement Commission and the EPA constitute the conferees.

At the second conference session, the conferees unanimously recommended a program of necessary action. The recommendations of the conferees are as follows:

To reduce or eliminate the accelerated eutrophication of Escambia Bay and Mulat-Mulatto Bayou, and to provide water quality suitable for a wide diversity of desirable uses, the following water quality management and waste abatement program is recommended to be accomplished, except as otherwise specified, by not later than December 31, 1972. The first recommendation:

1. There shall be reductions of 94 percent 5-day BOD, 94 percent nitrogenous wastes, and 90 percent phosphorus wastes discharged to the Escambia River and Bay from major source in Florida, including American Cyanamid, Escambia Chemical and the Monsanto Company. Due to the distance from Escambia Bay of Container Corporation of America's plant site, a reduction of 90 percent 5-day BOD will be required. These percent reductions permit the following allowable waste effluents:

Container Corporation: 5-day BOD, 4,850 pounds; total nitrogen, not applicable; total phosphorus, no discharge.

Monsanto: the BOD of 605 pounds, total nitrogen 248, total phosphorus 46.

American Cyanamid: BOD 425 pounds, total nitrogen 323 pounds, and the phosphorus portion is not applicable to this.

Escambia Chemical Corporation: the BOD will be 17 pounds, total nitrogen 477 pounds, total phosphorus 35 pounds.

The foregoing allowable waste loads shall be attained by December 31, 1972. If further investigation shows that these limits are excessive, Monsanto, American Cyanamid, and Escambia Chemical must develop a plan to completely remove their discharges from the Bay.

There shall be maximum feasible reduction of carbonaceous organic material. All waste dischargers shall monitor effluents to ensure reductions and conduct feasibility studies and submit a plan of abatement for carbonaceous waste to the conferees by February 15, 1972.

The effects of the expansion of the Container Corporation mill's pulping capacity on BOD discharged will be evaluated and reviewed by the conferees at the appropriate time. In addition, Container Corporation shall provide secondary treatment to the bleach plant and woodyard waste.

2. The progress of the waste abatement program of the city of Pensacola has not been satisfactory. The State of Florida shall take appropriate action in accordance with State rules and regulations to assure that the Northeast sewage treatment plant abate its present discharge to Escambia Bay. The State of Florida will submit to the conferees by August 15,

1971, a satisfactory plan for accomplishing this objective.

Indications are that some negotiations have transpired among the Escambia-Santa Rosa Regional Planning Council, the County Commissioners of Escambia and Santa Rosa Counties, and the City of Pensacola. However, tangible results are not evident. The parties shall conclude negotiations at an early date and formulate a single program for the collection, treatment and disposal of wastewaters into the Escambia River Basin. A progress report shall be furnished the conferees by April 15, 1971, by the Escambia-Santa Rosa Regional Planning Commission.

3. The conferees recognize the in-plant changes made by the Monsanto Company to reduce its waste discharges to the Escambia River. The conferees require that the company shall attain the recommended allowable waste effluent limit or install a closed circuit cooling system by December 31, 1972.

The conferees support the State of Florida's action against Monsanto for the immediate control of the discharge of toxic polychlorinated biphenyls.

4. The Environmental Protection Agency laboratory at Gulf Breeze, Florida, shall convene a conference of experts on menhaden fisheries. This conference shall recommend methods to limit the migration of juvenile menhaden to the Upper Escambia Bay and its related bayous.

The findings of this conference will be reported to the conferees to form a basis of future action for the control of fish kills in Escambia Bay and its bayous.

5. Color in the Escambia River at the Alabama-Florida State line as measured at Highway 4 Bridge near Century, Florida, shall be reduced to levels meeting Alabama, Florida, and Federal standards. The Container Corporation of America is to continue its studies, utilizing present research findings, on methods for removing color from its waste discharge. The company shall report its progress to the conferees by February 15, 1972.

6. No further construction dredging shall be permitted in Escambia Bay and Mulatto Bayou until the artificial buildup of organic sediment deposits ceases and stabilizes. Maintenance dredging of existing channels shall be by hydraulic pipeline or by hopper dredge. Disposal of all dredge materials from hydraulic dredging shall be to upland spoil sites. The Corps of Engineers is requested to provide the conferees with a listing of these sites.

7. The Monsanto Company and Gulf Power Company shall monitor their heated discharges to the river and bay and the effect of these discharges on the biota and report quarterly to the conferees the results of their monitoring programs. The

conferees agree to the Gulf Power Company plans for the installation of cooling towers for its planned expansion.

8. Century, Florida, and East Brewton, Alabama, shall install by not later than December 31, 1972, secondary waste treatment facilities acceptable to their respective State water pollution control agencies.

As noted previously, the conference has been reconvened to consider the progress which has been made to abate the pollution of the Escambia River Basin and to make any further recommendations or modifications of the previous recommendations that the conferees deem necessary.

Very briefly, I will go into the procedures for the conference.

The conferees will be called upon to make statements. The conferees in addition may call upon participants whom they have invited to the conference to make statements. In addition, we shall call upon all other interested individuals who have indicated they wish to present statements. At the conclusion of each statement, the conferees will be given an opportunity to comment or ask questions.

I would like to stress the point that the parties to the conference are seated at the head table. In order to carry on an orderly proceeding, we cannot permit any questions from the floor and we will have to confine any exchange between the conferees and the participants.

Everyone will be given an opportunity to present anything that is relevant to the conferees and I feel sure that we will have time to hear everyone.

At the end of the statements, we will have a discussion among the conferees and then go into executive session. Following this session the conferees will announce revised conclusions and recommendations which have been dictated by the facts of the situation that will appear today.

Under the Federal law, the Administrator of the Environmental Protection Agency is required at the conclusion of the conference to prepare a summary which will be sent to the conferees. Conclusions and recommendations of the conferees do not have any basis in law until they are adopted by the Administrator. However, prior to that adoption they will serve as administrative guides to the conferees.

A record and verbatim transcript is being kept and we have a court reporter, Mrs. Rankin, who is taking notes now. We expect to print a transcript of these proceedings and it normally takes four to six months to do this. If any of you need to receive any portion of the record before that time, I would suggest that you contact Mrs. Rankin and make your arrangements with her.

I would now like to call on the other conferees for any opening statement they may have.

Mr. Levin.

DAVID LEVIN, CHAIRMAN
FLORIDA AIR AND WATER
POLLUTION CONTROL BOARD
TALLAHASSEE, FLORIDA

MR. LEVIN: Well, first of all, speaking on behalf of not only the State of Florida's Pollution Control Department but also the citizens of Escambia and Santa Rosa County, I would like to welcome to Gulf Breeze and Pensacola the gentlemen who are seated here at the head table. We are honored by the presence of Mr. Ravan, who is the head of the EPA for the Southeastern Region, Mr. White and Mr. Traina also with EPA, and Mr. Crockett from the State of Alabama, and of course Mr. Mauriello from our department. It is really helpful to know that we can rely on people such as this whenever we find ourselves in the trouble that we have gotten ourselves into.

The only statement I would like to make is I would like to tell you about a little prayer that I keep on my desk and I have had it there for several years. And the prayer, which is an Indian prayer, says:

> Great Spirit, grant that I not criticize my neighbor until I have walked a mile in his moccasins.

That is a pretty good thing to keep in mind, I think, insofar as this conference is concerned. You know, it is real easy to sit back and criticize. It is an entirely different thing to be able to come up and say, well, now, I don't think this is right, but I do think that this is right.

Everybody knows that is over the age of six years that we do have a problem here and everybody knows what the problem is. To the people who will represent industries, I hope you will see the problem insofar as the public is concerned and insofar as a dying estuary is concerned. To the people who are the conservationists or ecologists or environmentalists, whatever you want to call yourselves, please keep in mind that we have got thousands and thousands of jobs involved in this thing. So there is not going to be any easy solution.

As I said last Friday, we have got to move cautiously but quickly and we have got to come up with some answers here today and balance, if we possibly can, a way to save Escambia Bay and only as a last resort do anything that is going to take food off of peoples' tables.

Now, John won't say this because John is too nice, John White, but I am not nice and I never have been. I have said this around the State of Florida. We want to hear--at least I want to hear from people who really have something to contribute to why we are spending three days here in Pensacola, but as I have requested in Fort Lauderdale, in Tampa, in Miami, in Jacksonville, all over the State of Florida, if somebody else has already said something it really doesn't accomplish a whole lot to come right behind them and say the same thing, because what is happening is we are then taking the time that we could possibly spend elsewhere and really derive some benefit from it. So if you will keep that in mind, as far as I am concerned, I think that would be of most help to those people that are sitting up here at the head table.

Again I want to welcome not only all these gentlemen who are here and who are giving of their time to come down here and help us solve these problems, but to all the members of their staffs and our staff, and then launch into this thing with a prayer, quite frankly, that maybe we can come up with the answers that we need. And I want to welcome all of you here for helping us try to find these answers.

Thank you very much, John.

MR. WHITE: Thank you, David.

J. L. Crockett, Jr.

Mr. Crockett, do you have any statement?

J. L. CROCKETT, JR.
DIRECTOR, TECHNICAL STAFF
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MONTGOMERY, ALABAMA

MR. CROCKETT: Only to say that we appreciate the welcome by Mr. Levin and to tell you that Alabama is doing and will continue to do its part in attempting to solve this problem.

MR. WHITE: Thank you.

Mr. Ravan?

JACK E. RAVAN
REGIONAL ADMINISTRATOR
REGION IV
ENVIRONMENTAL PROTECTION AGENCY
ATLANTA, GEORGIA

MR. RAVAN: Mr. Chairman, David and Mr. Crockett, ladies and gentlemen.

On behalf of Bill Ruckelshaus, the Administrator for the Environmental Protection Agency, we are happy and pleased and concerned at the same time to participate in this reopening of the Escambia conference. The matters before the conferees here are extremely serious. I echo the words of Mr. David Levin that we need to move quickly but with caution, addressing those issues on all the spectrums of the environment. We are very much interested in hearing the participants today and hopefully to arrive at some positive course of action which will restore this body of water which means so much both to the State of Alabama and Florida and we as your representatives of the Federal Government.

It is good to be here today.

MR. WHITE: Mr. Traina?

MR. TRAINA: No, let's proceed.

MR. WHITE: Before we get started, I would like to make one other statement with respect to the agenda or the lack of agenda. We get many requests about this, but our normal procedure is that we make a Federal technical presentation and call on any other Federal agencies who are interested in making a statement. We then go next to the States. The State of Florida will be the first that we will call on today and their technical staff will make a presentation and, of course, any person who indicates that they wish to make a statement, and then down to the Alabama technical staff and any participants from Alabama.

I think our agenda will be kept short or at least our session will be kept short. We don't have that many speakers today. I believe we will have time to hear you all out, but as Mr. Levin says, for the sake of brevity, I would appreciate it if you would not be repetitious on anything that we have heard previously.

With that, I will call on Mr. Traina for the Federal presentation.

PAUL J. TRAINA, ACTING DIRECTOR
WATER PROGRAMS BRANCH, REGION IV
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ATLANTA, GEORGIA

MR. TRAINA: Thank you, Mr. White.

To present the Federal report is Mr. John A. Little, who is Director of our Division of Surveillance Analysis at our Water Laboratory in Athens, Georgia.

JOHN A. LITTLE, DIRECTOR
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ATHENS, GEORGIA

MR. LITTLE: Mr. Chairman, conferees and ladies and gentlemen.

I am John A. Little, the Director of the Surveillance and Analysis Division, EPA, Region IV.

The EPA presentation this morning will be in two parts. You have two reports in front of you, one of which is entitled, "Water Quality Comparison Study, Escambia River and Other Northwest Florida Streams." An additional report on the study of Container Corporation will be presented immediately after I am finished.

I would point out before I start, and I intend to read the text material from this report, that it would take a very close perusal on your part to be able to follow it all. I hope that you will be able to get the gist of what is in here and we will be able to study the report in some detail perhaps at a later time during this week.

At this time I would like to proceed and read the text portion of the report.

MR. TRAINA: Mr. Little, you will submit the report for the record in its entirety?

MR. LITTLE: Yes, I would like this report to be submitted in its entirety for the record and I imagine Mr. Adams will do so also with his report.

MR. WHITE: Without objection, it will be entered in the record as if read.

(The above-mentioned report follows:)

WATER QUALITY COMPARISON STUDY
ESCAMBIA RIVER AND OTHER NORTHWEST FLORIDA STREAMS

Environmental Protection Agency
Region IV
Surveillance and Analysis Division
Athens, Georgia

January 1972

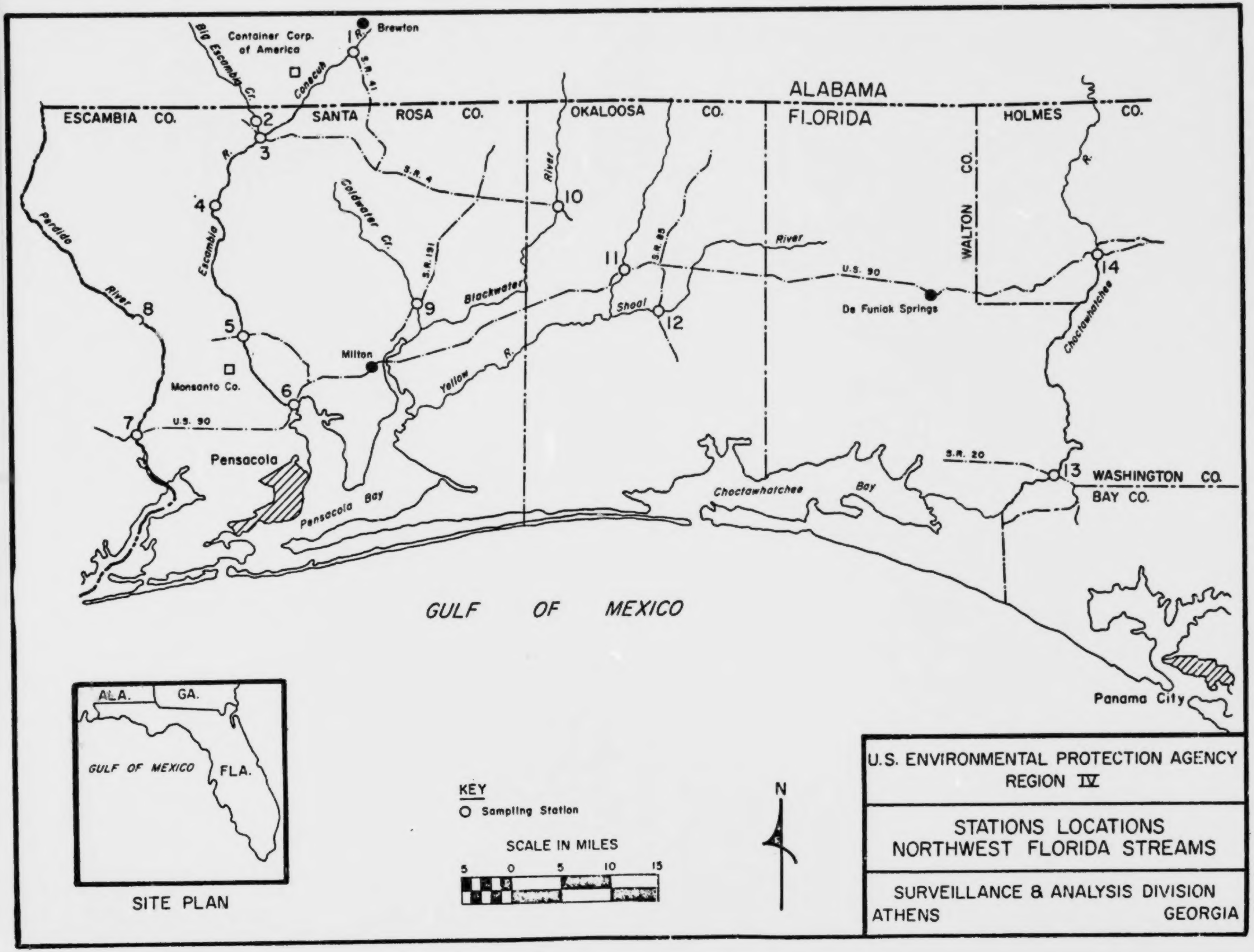
INTRODUCTION

In October 1971, the Southeast Region of the Environmental Protection Agency (EPA) received a request for technical assistance in comparing nutrient concentrations in the Escambia River watershed with other streams in the northwest Florida area. A meeting was held in Atlanta between EPA, the Florida Department of Pollution Control (FDPC), and Alabama Water Improvement Commission (AWIC) personnel to prepare for the third session of the Escambia River Conference planned for January, 1972. Because of extensive recent studies in the Conecuh-Escambia River and Bay it was decided that very little additional field work was necessary. A limited survey was planned to produce data for use in comparing water quality (including nutrient quality) of the Escambia River with other streams in the Northwest Florida area. Of particular interest were the relative nitrogen, phosphorus and organic concentrations. A cooperative study was conducted from November 22 to December 6, 1971 by FDPC and EPA. Florida personnel collected samples and performed the analysis for all reported parameters except nitrogen phosphorus and TOC in their Pensacola laboratory. Nutrient analyses were completed at the Southeast Water Laboratory in Athens, Georgia.

DESCRIPTION OF AREA

The study area lies between and includes the Perdido and Choctawhachee River Basins in Northwest Florida (Figure 1). Streams in this area drain the Florida panhandle and extreme Southern Alabama. Land use in the northern portions of the Escambia, Yellow and Choctawhatchee Basins is primarily agricultural with timber covered areas predominating in the southern portion. All streams under consideration except the Conecuh-Escambia

FIGURE 1



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV

STATIONS LOCATIONS
NORTHWEST FLORIDA STREAMS

SURVEILLANCE & ANALYSIS DIVISION
ATHENS GEORGIA

receive relatively small quantities of domestic or industrial wastes and can be classified as clean streams, particularly in the reaches covered by this survey. Drainage areas upstream from some of the sampling stations are:

Sta. No. 3, Escambia River, Florida, Highway # 4, 3817 sq. mi.
Sta. No. 13, Choctawhatchee River, Florida, Highway # 20, 4384 sq. mi.
Sta. No. 14, Choctawhatchee River, U. S. Highway # 90, 3499 sq. mi.
Sta. No. 11, Yellow River, U. S. Highway # 90, 624 sq. mi.
Sta. No. 12, Shoal River, Florida, Highway # 85, 474 sq. mi.
Sta. No. 8, Perdido River, Barrineau Park, 394 sq. mi.

DISCUSSION OF RESULTS

One grab sample per week at mid water depth was taken for three consecutive weeks from 14 locations. Streamflows in the area were unusually low when the first set of samples were collected but increased progressively on two additional runs as a result of locally heavy rainfall. Flow information was provided by the U. S. Geological Survey. Figure 1 shows the sampling stations and Appendix A lists the tabulated study data. Appendix B shows average values for data collected by EPA or its predecessor agencies between 1966 and 1971. These data were retrieved from STORET[1/] and represent part of the water quality record for these stations. Figures 1 through 9 are graphs of both the recent and STORET water quality data. Minor variations were observed in comparing water quality of these streams. The following are general obser-

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[1/] STORET is a computerized system for storage and retrieval of water quality data.

FIGURE 2
FLOW DURING STUDY PERIOD
PLUS AVERAGE FLOW FOR STORET DATA

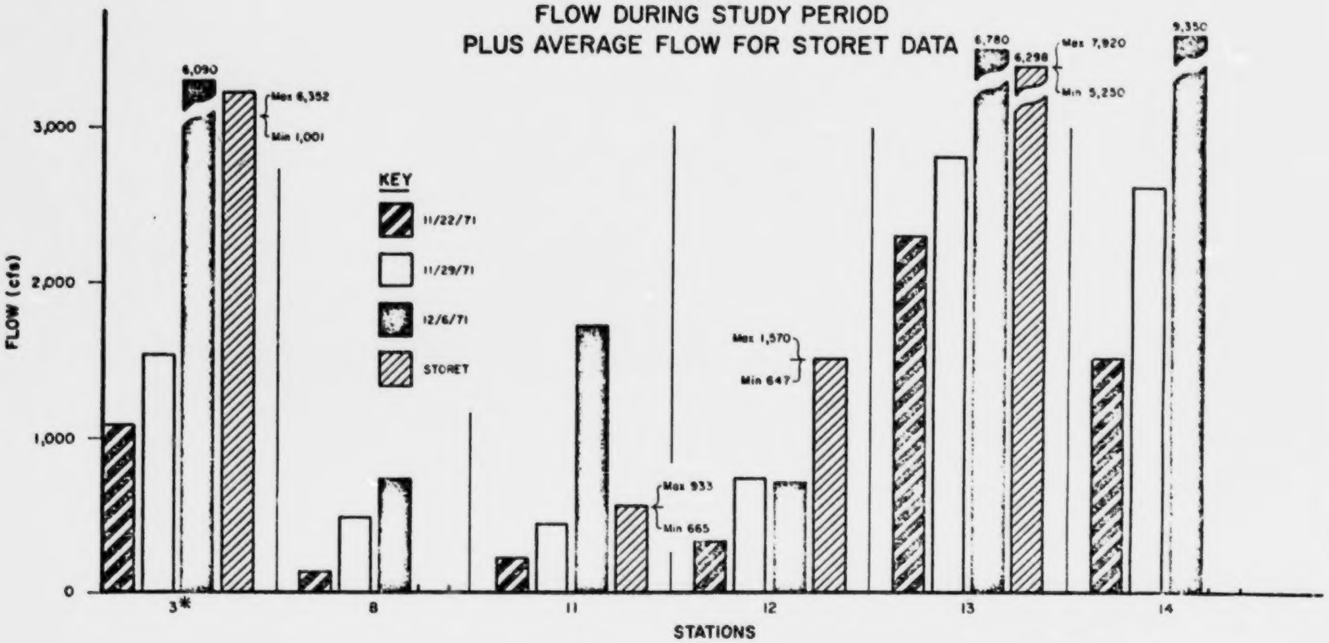
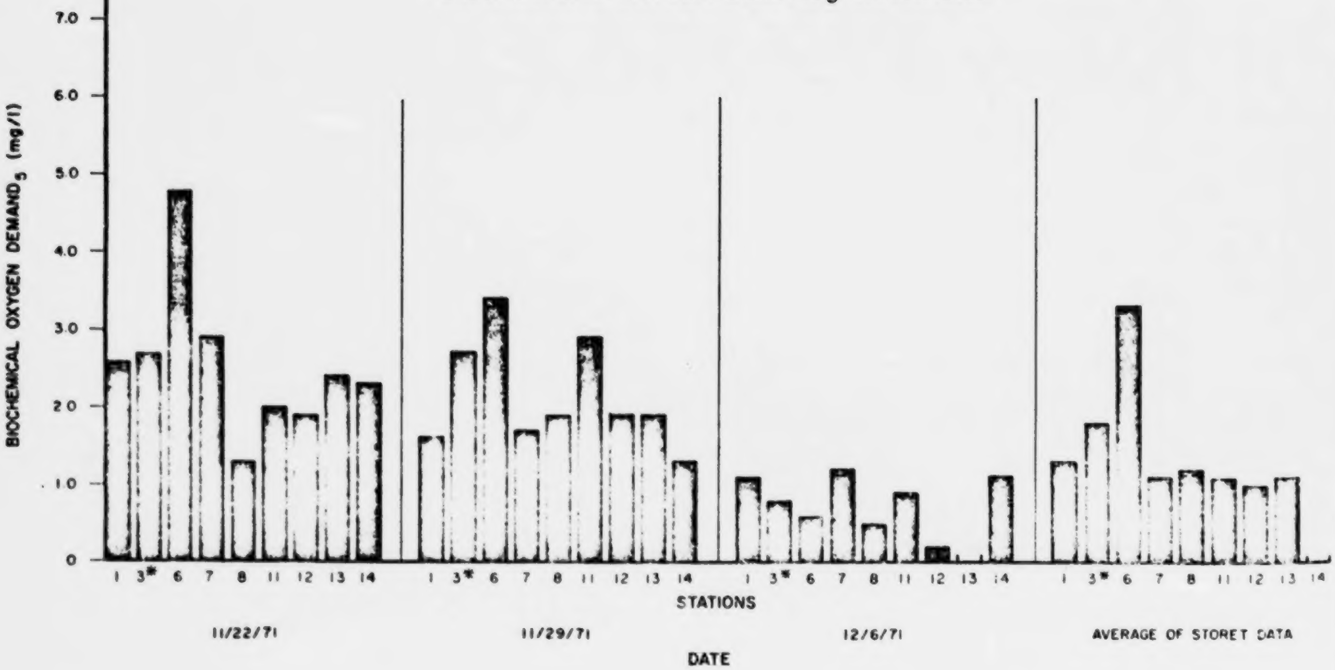


FIGURE 3
BIOCHEMICAL OXYGEN $DEMAND_5$ VARIATIONS



NOTE * ESCAMBIA RIVER AT CENTURY FLA

FIGURE 4
PHOSPHORUS VARIATIONS

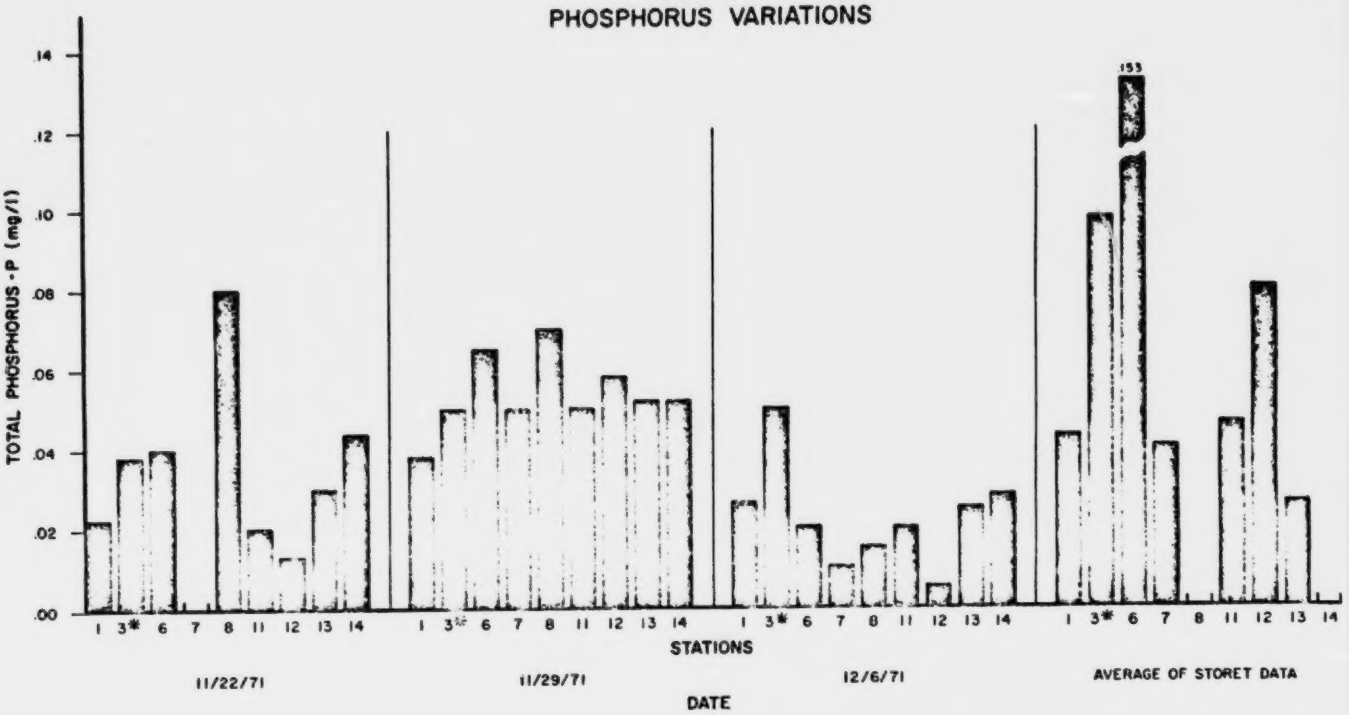
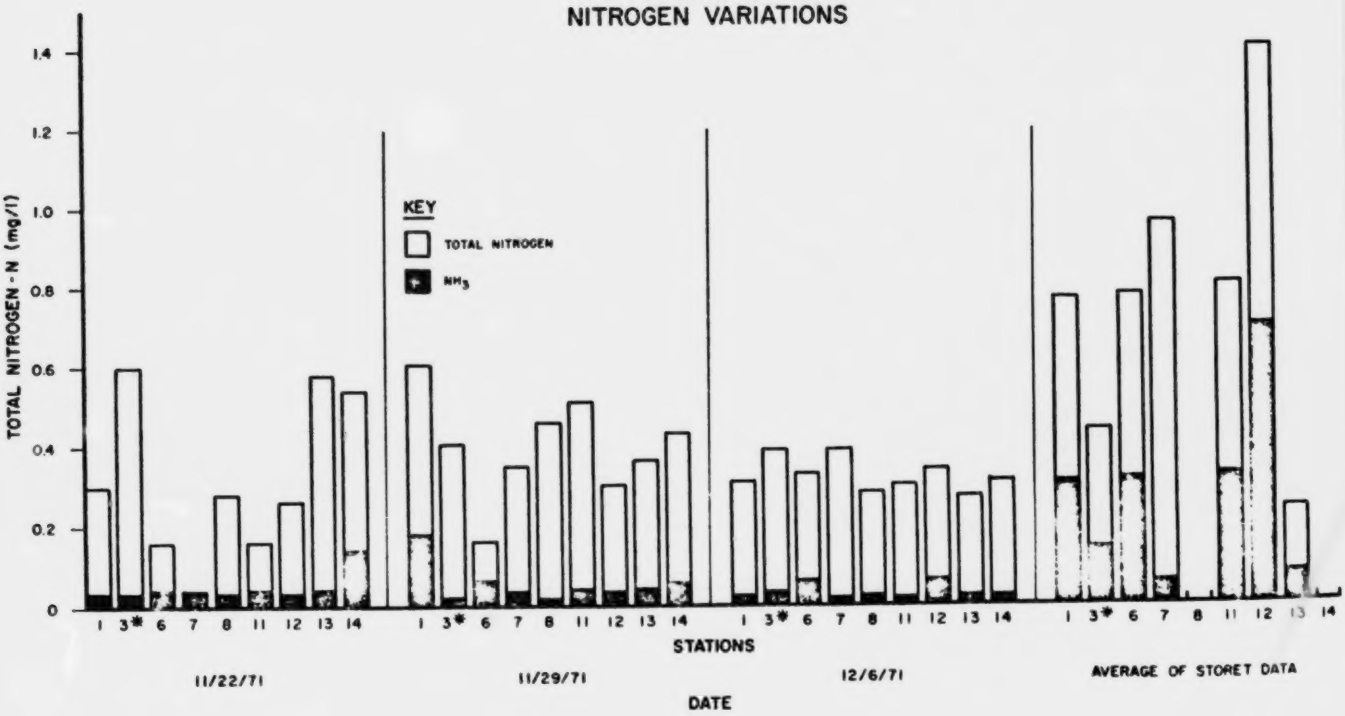


FIGURE 5
NITROGEN VARIATIONS



NOTE * ESCAMBIA RIVER AT CENTURY FLA.

FIGURE 6
COLOR VARIATIONS

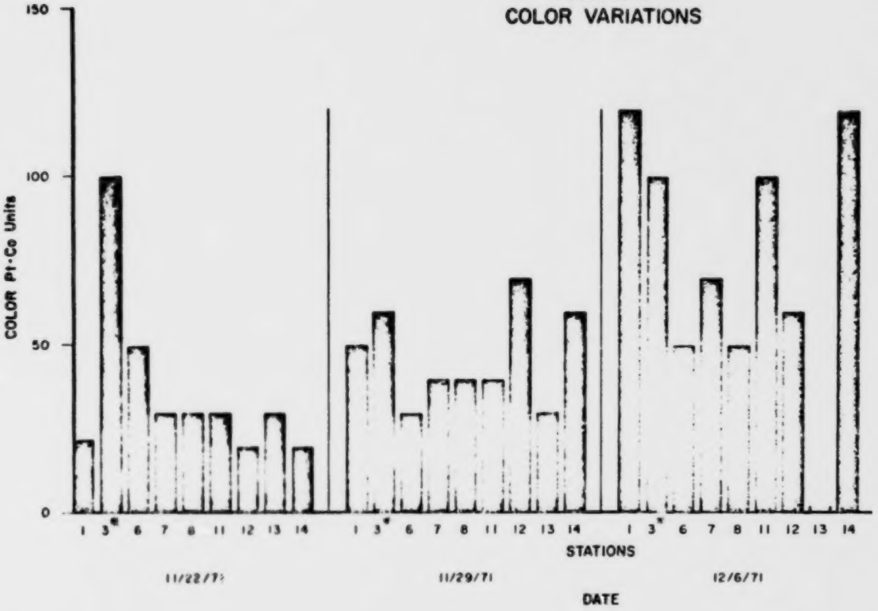
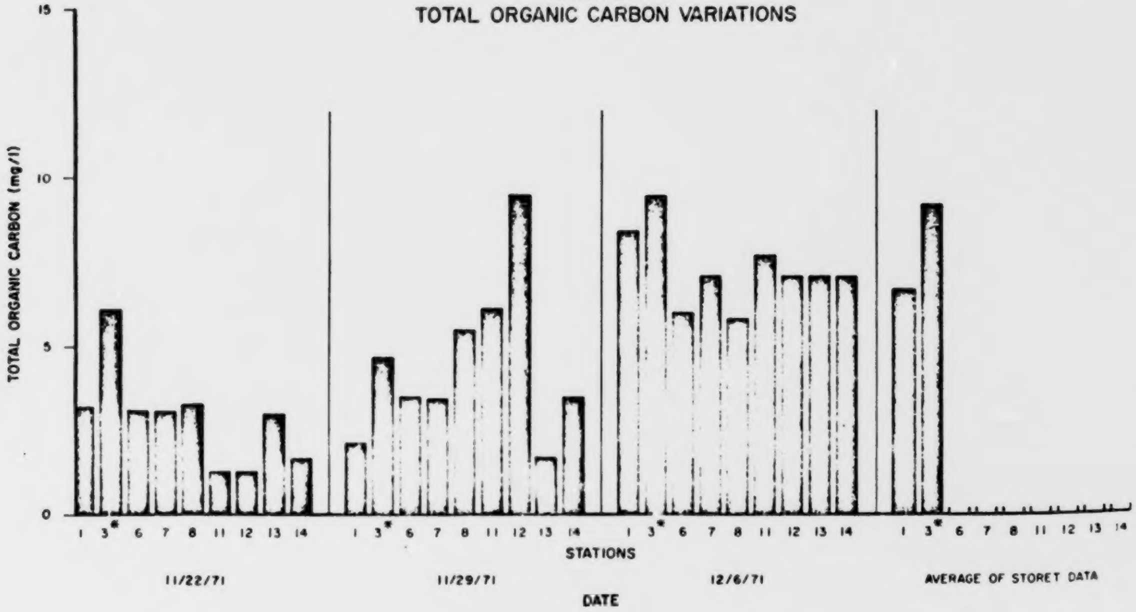


FIGURE 7
TOTAL ORGANIC CARBON VARIATIONS



NOTE * ESCAMBIA RIVER AT CENTURY, FLA.

FIGURE 8
TOTAL & DISSOLVED SOLIDS VARIATIONS

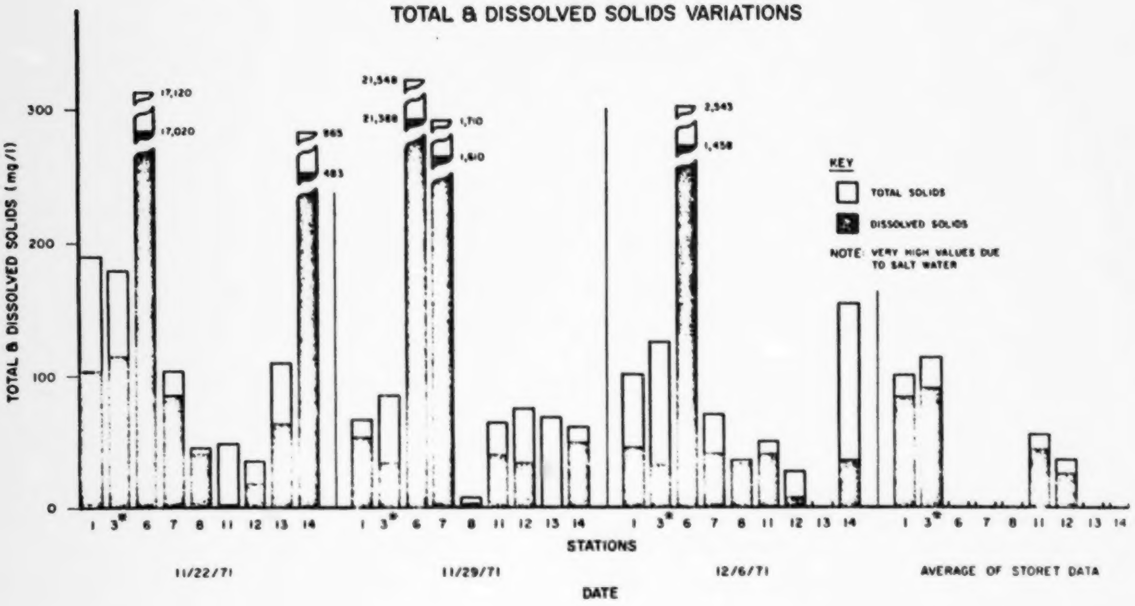
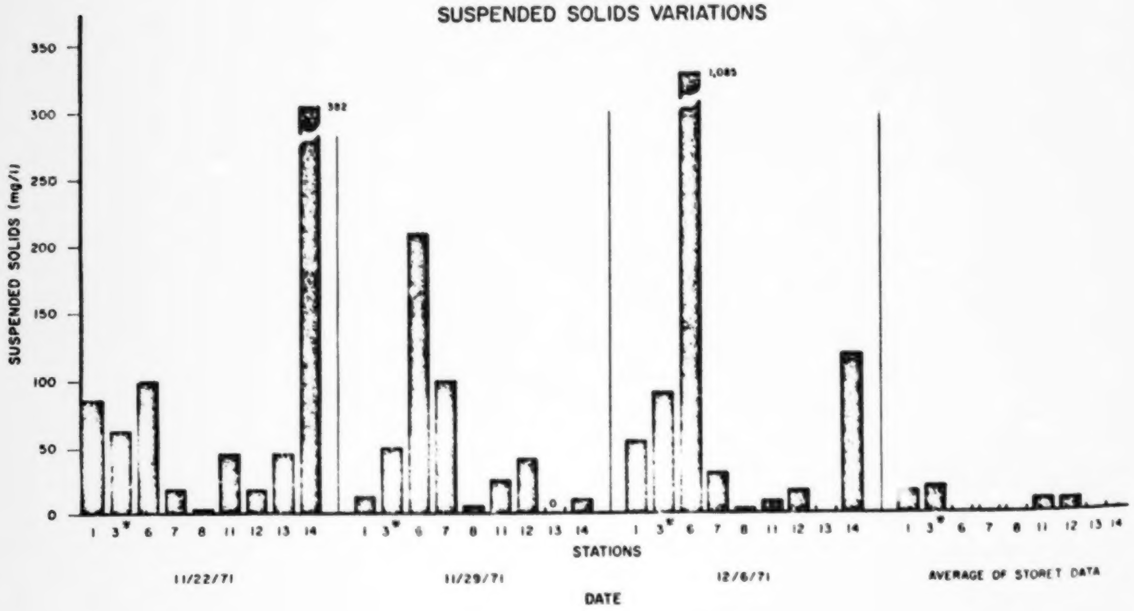


FIGURE 9
SUSPENDED SOLIDS VARIATIONS



NOTE * ESCAMBIA RIVER AT CENTURY, FLA

vations taken from Figures 1 - 9.

Five-day Biochemical Oxygen Demand (BOD_5)

1. The BOD_5 concentrations varied inversely with flow.
2. At low flow, the BOD_5 concentrations on the Escambia River at Station No. 3 were only slightly higher than in other study area streams.
3. A maximum 4.8 mg/l value recorded on 11/22/71 at Station No. 6 on the Escambia was downstream from Monsanto Company's waste outfall.
4. Most of the BOD_5 concentrations (except the 4.8 value) were less than or equal to ranges normally found in healthy streams.
5. STORET data are comparable to 1971 results.

Total Phosphorus

1. During the 1971 study, Escambia River phosphorus concentrations were similar to those of other streams. One higher phosphorus value at Station 3 on December 6, 1971, could have resulted from upstream waste discharges, but the high flow on this date tends to preclude this possibility.
2. The slightly higher values from STORET are probably due to seasonal variations, in rainfall and streamflow, and/or improved waste treatment practices since 1966.

Total Nitrogen

1. During the 1971 study, Escambia River nitrogen concentrations were

generally similar to those of other streams. The one low flow elevated value (0.6 mg/1) at Station 3 (11/22/71) would appear to result from upstream waste discharges, although Station 4 downstream showed a substantial decrease (0.31 mg/1).

2. Phosphorus comment (2) above applies.

Color

1. Color increased with flow. This is probably caused by discharge of highly colored water from storage in swamp and marshy areas.
2. Evidence of paper mill waste can be detected at Station No. 3 on the Escambia at low flows.
3. At higher flows the Conecuh and Choctawhatchee Rivers had more color than the Escambia.

Total Organic Carbon (TOC)

1. All TOC values were relatively low (<10 mg/1).
2. Some increase in TOC values downstream from Brewton, Alabama, and Container Corporation discharges were noted, although on November 29, 1971, there were much higher concentrations in other study area streams.
3. TOC values increased with streamflow.

Solids

1. High solids observed on river stations closest to the Gulf are influenced by salt water intrusion.
2. At low flow, solids were higher on the Escambia than in other study streams.

3. Solids concentrations at Station No. 3 on the Escambia and Station No. 1 on the Conecuh are essentially the same.
4. Solids did not vary appreciably with flow for the range of flows covered in the 1971 study.

CONCLUSIONS

1. Although the 1971 study was not an exhaustive investigation, there is strong evidence that quality among all the streams studies is comparable. Seasonal trends and effects of rainfall and runoff can be better defined by a long term monitoring program.
2. At low flow, the results of waste discharges from the Container Corporation-Brewton, Alabama area are evident in the increased color and TOC values between Station 1 and 3.
3. STORET data shows comparable water quality among the streams selected for study.
4. When concentrations for various water quality constituents studied are converted to loading (lbs/day), there will be an appreciable difference among river basins in the study area. Loading is a function of streamflow which varies among the study streams. Differences among the estuarine ecosystems for each river basin are to be expected -- possibly as a result of differing streamflow. Enforcement actions, however, should be formed on controllable factors rather than on effect of flow which is largely a natural phenomenon.

Appendix A

Escambia River Comparitive Study
Summary of Data

Sta. No.	Stream and Location	Date (1971)	Flow cfs	Temp °C	DO mg/l	BOD_5 mg/l	Turb. JCU	COD mg/l	pH Field	Color Pt-Co Units	Total Solids mg/l	Dissolved Solids mg/l	Coliform MPN/100 ml	TKN mg/l	NH_3-N mg/l	NO_2+NO_3-N mg/l	Total Phos-P mg/l	TOC mg/l
1	Conecuh R.-	11/22		13.0	10.1	2.6	16	19.0	7.2	20	191	105	1,600	0.15	0.03	0.15	0.022	3.2
	Hwy #41	11/29		13.6	9.8	1.6	22	26.6	7.2	50	69	55	920	0.32	0.17	0.29	0.038	2.1
		12/6		10.9	10.4	1.1	85	11.4	6.9	120	103	48	>2,400	0.18	0.02	0.13	0.026	8.4
2	Big Escambia Cr.-	11/22		12.0	9.4	1.9	31	4.0	6.4	50	262	259	--	0.14	0.04	0.13	0.032	2.5
	Near mouth	11/29		13.0	9.0	1.7	11	7.6	6.6	40	30	21	13,000	0.25	0.30	0.17	0.022	2.7
		12/6		11.5	12.2	0.8	10	7.6	6.2	60	25	8	1,600	0.25	0.02	0.09	0.013	5.4
3	Escambia R. -	11/22	1,080	13.6	8.2	2.7	42	11.0	6.9	100	180	117	>2,400	0.47	0.03	0.13	0.038	6.1
	Hwy. No. 4	11/29	1,520	13.8	8.7	2.7	13	22.8	6.8	60	87	36	3,300	0.29	0.01	0.12	0.050	4.7
		12/6	6,090	12.0	7.4	0.8	90	15.2	6.6	100	127	35	>2,400	0.22	0.03	0.17	0.050	9.5
4	Escambia R. -	11/22		13.8	8.8	2.0	44	7.0	6.8	70	189	130	540	0.16	0.04	0.15	0.035	4.5
	McDavid Landing	11/29		12.8	9.0	1.9	14	7.6	7.0	40	78	77	3,300	0.18	0.06	0.12	0.040	5.0
		12/6		10.5	10.7	0.3	70	15.2	6.8	70	100	43	>2,400	0.18	0.06	0.14	0.028	8.0
5	Escambia R. -	11/22		14.8	8.6	2.2	28	11.0	6.9	60	--	--	>2,400	0.23	0.03	0.14	0.034	3.5
	Hwy. No. 184	11/29		13.5	8.7	1.0	14	11.4	6.8	60	70	59	2,300	0.18	0.02	0.12	0.048	5.0
		12/6		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	Escambia R. -	11/22		18.5	6.6	4.8	21	chlo-	8.8	50	17,120	17,020	>2,400	0.32	0.04	0.07	0.040	3.1
	Hwy. No. 90	11/29		16	8.3	3.4	5	ride	8.9	30	21,548	21,338	4,900	0.19	0.06	0.07	0.065	3.5
		12/6		12	9.6	0.6	20	inter- ference	6.8	50	2,543	1,458	>2,400	0.22	0.06	0.11	0.020	6.0
7	Perdido R. -	11/22		--	--	2.9	25	chlo-	6.8	30	105	37	350	--	0.04	0.09	--	3.1
	Hwy No. 90	11/29		14.5	7.9	1.7	8	ride	6.4	40	1,710	1,610	24,000	0.22	0.03	0.13	0.050	3.4
		12/6		12.0	9.8	1.2	43	inter-	6.2	70	73	42	>2,400	0.28	0.01	0.11	0.010	7.1
8	Perdido R. -	11/22	145	13.5	9.4	1.3	34	7.0	6.4	30	47	43	350	0.17	0.03	0.11	0.080	3.3
	Barrineau Park	11/29	496	13.2	8.7	1.9	18	15.2	6.2	40	10	4	13,000	0.28	0.01	0.18	0.070	5.5
		12/6	727	13.0	10.2	0.5	22	11.4	5.4	50	38	35	>2,400	0.19	0.02	0.09	0.015	5.8
9	Big Coldwater Cr.-	11/22	257	12.5	10.2	7.1	18	30.0	6.4	50	236	219	350	0.22	0.01	0.32	0.010	1.1
	Hwy. No. 191	11/29	572	14.6	9.6	3.4	25	19.0	6.1	30	31	30	1,600	0.24	0.05	0.28	0.040	6.1
		12/6	478	14.9	9.7	0.7	3	19.0	6.1	20	32	15	540	0.17	0.03	0.22	0.010	3.2
10	Blackwater R. -	11/22	96	12.0	10.5	2.1	13	19.0	6.4	30	30	30	79	0.08	0.02	0.08	0.011	2.5
	Hwy. No.4	11/29	310	13.8	9.7	1.8	30	30.4	6.0	60	66	49	>2,400	0.38	0.17	0.29	0.045	10.0
		12/6	350	13.5	9.7	1.1	23	53.2	6.0	80	45	27	920	0.17	0.01	0.05	0.016	8.5
11	Yellow R. -	11/22	258	12.2	10.1	2.0	12	11.0	7.1	30	50	4	--	0.10	0.04	0.06	0.020	1.3
	Hwy. No. 90	11/29	497	14.4	9.9	2.9	32	7.6	6.9	40	68	41	>2,400	0.43	0.04	0.08	0.050	6.1
		12/6	1,760	11.1	9.7	0.9	40	57.0	6.4	100	52	42	>2,400	0.29	0.01	0.01	0.020	8.7
12	Shoal R. -	11/22	334	12.5	10.4	1.9	11	15.0	6.2	20	38	20	170	0.15	0.03	0.11	0.013	1.3
	Hwy. No. 185	11/29	735	14.3	10.0	1.9	50	7.6	6.2	70	77	36	>2,400	0.19	0.03	0.11	0.058	9.[illegible]
		12/6	714	13.0	9.6	0.2	7	7.6	5.9	60	29	10	>2,400	0.23	0.06	0.11	0.005	7.1
13	Choctawhatchee R.-	11/22	2,320	14.5	9.0	2.4	22	19.0	7.2	30	111	65	920	0.25	0.04	0.33	0.030	3.0
	Hwy. No. 20	11/29	2,820	14.8	8.6	1.9	6	11.4	7.2	30	71	71	>2,400	0.16	0.04	0.30	0.052	1.7
		12/6	6,780	--	--	--	--	--	--	--	--	--	--	0.21	0.02	0.06	0.025	7.1
14	Choctawhatchee R.-	11/22	1,550	13.0	9.5	2.3	10	19.0	6.8	20	965	583	540	0.22	0.14	0.32	0.044	1.7
	Hwy. No. 90	11/29	2,650	13.3	8.9	1.3	38	19.0	7.0	60	63	51	--	0.16	0.05	0.27	0,052	3.5
		12/6	9,350	10.1	9.9	1.1	104	38.0	6.4	120	157	37	>2,400	0.20	0.02	0.11	0.028	7.1

Appendix B

Escambia River Comparitive Study
Summary of Average STORET Data

Sta. No.	Stream and Location	Inclusive Dates	Flow cfs	Temp °C	DO mg/1	BOD_5 mg/1	Turb. JCU	COD mg/1	pH Field	Color Pt-Co Units	Total Solids mg/1	Dissolved Solids mg/1	Coliform MPN/100 ml	TKN mg/1	NH_3-N mg/1	NO_2+NO_3-N mg/1	Total Phos.-P mg/1	TOC mg/1
1	Conecuh R.-Hwy. No. 41	4/24/68-8/28/70		26.3	7.8	1.3			7.0		101	83	2,775	0.66	0.31	0.11	0.042	6.7
2	Big Escambia Cr.-near mouth	4/24/68-7/2/71		23.7	7.5	1.3	32	12.0	6.0		51	35	16,252					8.0
3	Escambia R.-Hwy. No. 4	4/24/68-8/28/70	3,243	25.9	6.3	1.8	25		6.7		114	92	30,171	0.35	0.14	0.09	0.065	9.2
4	Escambia R.-McDavid Landing	4/28/68-6/28/68		24.4	5.9	1.1			6.8				7,085					
5	Escambia R.-Hwy. No. 184	4/24/68-8/28/70	4,677	25.5	6.3	1.4		15.1	6.6				12,381	0.30	0.13	0.12	0.052	8.8
6	Escambia R.-Hwy. No. 90	4/24/68-6/28/68		25.6	3.7	3.3			7.1		6,990	6,977	2,778	0.63	0.31	0.15	0.133	
7	Perdido R.-Hwy. No. 90	12/2/66-1/4/67		13.5	9.0	1.1			5.6				3,839	0.89	0.06	0.07	0.013	
8	Perdido R.-Barrineau Park	4/24/68-6/28/68		13.2	10.0	1.2			5.7				2,097					
9	Big Coldwater Cr.-Hwy No.191	2/18/66-6/9/66	685	17.5	9.5	0.8		10.8	6.0				2,325		0.37		0.026	
10	Blackwater R.-Hwy. No. 4	4/4/66-6/9/66	203	17.3	9.5	1.0		11.3	5.4		36	29	957		0.43		0.036	
11	Yellow R.-Hwy. No. 90	4/4/66-4/18/66	816	17.7	9.0	1.1		9.6	6.7		56	44	1,277	0.70	0.33	0.11	0.046	
12	Shoal R.-Hwy. No. 185	2/24/66 6/9/66	1,460	19.5	8.7	1.0		10.6	6.0		39	27	2,222		0.70		0.026	
13	Choctawhatchee R.-Hwy. No. 20	1/22/68-2/9/68	6,298	10.3	9.2	1.1			7.4				909	0.23	0.08	0.11	0.026	

J. A. Little

MR. LITTLE: In October 1971 the Southeast Region of the Environmental Protection Agency received a request for technical assistance in comparing nutrient concentrations in the Escambia River watershed with other streams in the northwest Florida area. A meeting was held in Atlanta between EPA, the Florida Department of Pollution Control, and the Alabama Water Improvement Commission to prepare for the third session of the Escambia River conference planned for January 1972. Because of extensive recent studies in the Conecuh-Escambia River and Escambia Bay it was decided that very little additional field work would be necessary to meet this request. A limited survey was planned to produce data for use in comparing water quality, including nutrient quality, of the Escambia River with other streams in the Northwest Florida area. Of particular interest were the relative nitrogen, phosphorus and organic concentrations. A cooperative study was conducted from November 22 to December 6, 1971, by the Florida Department of Pollution Control and EPA. Florida personnel collected samples and performed the analysis for all reported parameters except nitrogen, phosphorus, and total organic carbon in their Pensacola laboratory. Nutrient analyses were completed at the Southeast Water Laboratory in Athens, Georgia.

J. A. Little

Description of the Area:

The study area lies between and includes the Perdido and Choctawhatchee River Basins in Northwest Florida and there is a figure that you might refer to there. Streams in this area drain the Florida panhandle and extreme southern Alabama. Land use in the northern portions of the Escambia, Yellow, and Choctawhatchee Basins is primarily agricultural with timber-covered areas predominating in the southern portion. All streams under consideration except the Conecuh-Escambia receive relatively small quantities of domestic or industrial wastes and can be classified as clean streams, particularly in the reaches covered by this survey. Drainage areas upstream from some of the sampling stations are:

And there is a list of six stations here, including stations on the Escambia River, two on the Choctawhatchee River, one on the Yellow River, one on the Shoal River, and one on the Perdido River.

Results:

One grab sample per week at midwater depth was taken for three consecutive weeks from 14 locations. Streamflows in the area were unusually low when the first set of samples was collected, but increased progressively on two additional runs as a result of locally heavy rainfall. Flow information was

J. A. Little

provided by the U. S. Geological Survey. Figure 1 shows the sampling stations and Appendix A lists the tabulated study data. Appendix B shows the average values for data collected by EPA or its predecessor agencies between 1966 and 1971. These data were retrieved from STORET, and STORET is a computerized system for storage and retrieval of water quality data, and represent part of the water quality record for these stations. Figures are presented that you might refer to with both the recent 1971 study data compared to the data from historical STORET information.

Minor variations were observed in comparing water quality of these streams. The following are general observations taken from the figures in the report. First for the parameter of 5-day biochemical oxygen demand:

The BOD_5 concentrations varied inversely with flow. At low flow, the BOD_5 concentrations on the Escambia River at Station No. 3, and this station is at Century, Florida, were only slightly higher than in other study area streams.

A maximum 4.8 mg/l value recorded on November 22, 1971, at Station No. 6 on the Escambia was downstream from Monsanto Company's waste outfall.

I might add at this point that this area of the stream is tidally affected.

Most of the BOD_5 concentrations, except for this 4.8 mg/l value, were less than or equal to ranges normally found in healthy streams. STORET data are comparable to the 1971 results.

For the parameter of total phosphorus:

During the 1971 study, Escambia River phosphorus concentrations were similar to those of other streams. One higher phosphorus value at Station No. 3, again at Century, Florida, on December 6, 1971, could have resulted from upstream waste discharges, but the high flow on this date tends to preclude this possibility.

The slightly higher values from STORET, which are shown in the figures, are probably due to seasonal variations in rainfall and streamflow and/or improved waste treatment practices since 1966.

For the parameter of total nitrogen:

During the 1971 study, Escambia River nitrogen concentrations were generally similar to those of other streams. The one low flow elevated value of 0.6 mg/l of total nitrogen at Station 3 would appear to result from upstream waste discharges, although Station 4, which was some miles downstream from the Century station on the Escambia River, showed a substantial decrease in this nitrogen level to 0.31 mg/l.

J. A. Little

On total phosphorus parameter, the general comment that I just made about total nitrogen, in that the concentrations were generally similar to those of the other study streams outside of the Escambia River Basin, applies also.

For the parameter of color:

Color increased with flow. This is probably caused by discharge of highly colored water from storage in swamp and marshy areas.

Evidence of paper mill waste can be detected at Station No. 3, Century, on the Escambia at low flows.

At higher flows the Conecuh and Choctawhatchee Rivers had more color than the Escambia.

For the parameter of total organic carbon:

All TOC values were relatively low, less than 10 mg/l.

Some increase in TOC values downstream from Brewton, Alabama, and Container Corporation discharges were noted, although on November 29, 1971, there were much higher concentrations in the other study area streams.

TOC values increased generally with streamflow.

For the parameter of solids:

High solids observed on river stations closest to the Gulf are influenced by salt water intrusion, and by reference to the appropriate figure you can see easily the effect of salt

J. A. Little

water on the solids level at these same points.

At low flow, solids were higher on the Escambia than in other study streams.

Solids concentrations at Station No. 3 on the Escambia and at Station No. 1, and I might point out that this was upstream from Brewton and Container Corporation waste discharges, are essentially the same.

Solids did not vary appreciably with flow for the range of flows covered in the 1971 study.

The conclusions from this brief study are as follows:

1. Although the 1971 study was not an exhaustive investigation, there is strong evidence that quality among all the streams studied is comparable. Seasonal trends and effects of rainfall and runoff can be better defined by a long-term monitoring program.

2. At low flow, the results of waste discharges from the Container Corporation-Brewton, Alabama, area are evident in the increased color and TOC values between Stations 1 and 3.

3. STORET data show comparable water quality among the streams selected for study.

Finally, 4. When concentrations for various water quality constituents studied are converted to loading, for example pounds per day, there will be an appreciable difference among river basins in the study area. Loading is a function of streamflow which varies among the study streams. Differences among the estuarine ecosystems for each river basin are to be expected, possibly as a result of differing streamflow. Enforcement actions, however, should be formed on controllable factors rather than on effect of flow, which is largely a natural phenomenon.

Mr. Chairman, that concludes this particular report.

MR. WHITE: Thank you. Before you proceed, Mr. Little, I think we need to see if we have any questions by the conferees.

Mr. Levin?

Mr. Traina?

MR. TRAINA: Mr. Little, from your conclusions is it fair to say that based on your results that the water quality changes that you observed, not only on the Escambia but the other streams, are more from noncontrollable we might term natural conditions than they are from point source discharges?

MR. LITTLE: With the two exceptions of TOC and color at Station 3, that is a correct statement.

MR. TRAINA: Thank you.

MR. WHITE: I would like to ask one question. I am sure we will get into this a little later, possibly with the company or with the Florida technical presentation.

But what does the increased BOD below Monsanto's outfall indicate? Can you translate that into pounds a day?

MR. LITTLE: Well, I can't right offhand. I mentioned Mr. Chairman, that this is a tidal area. I would elaborate on the remarks that I made from the report in that there was no attempt to relate directly this value to the discharge from Monsanto, that there is definitely an elevation to be expected from the salt water area, but in my own personal opinion there is some elevation in this 4.8 mg/l value that was reported that is directly related to Monsanto's discharge.

MR. WHITE: But the tidal exchange keeps you from giving any accurate estimate from this?

MR. LITTLE: I couldn't get any more exact than the way we handled it in this particular study.

MR. WHITE: Any other questions?

Proceed.

Mr. Crockett?

MR. CROCKETT: I think Mr. Traina asked the question that I had in mind, but if you could be a little bit more specific. Now, of course, you did remark that at Station 3, which is the first station immediately below the Alabama-Florida State line, increases in color were observed, as these have been noted in previous presentations to the first two sessions of this conference, and also some slight increase in total organic carbon, did I understand that?

MR. LITTLE: That is correct.

MR. CROCKETT: Well, now, on the basis of the other parameters, you report, as I see it, minimal effects on the Escambia River at Station 3 by Alabama sources of pollution?

MR. LITTLE: I think that is a correct statement, Mr. Crockett. We didn't look at every parameter we could have, but we looked at the key ones, I think, of concern to this particular conference, No. 1 BOD and some of the nutrients of nitrogen and phosphorus, and for these three parameters we did not associate anything out of the ordinary at this particular station that could be attributed to the waste dischargers from the Alabama side.

MR. CROCKETT: Thank you.

MR. WHITE: Any other questions or comments?

MR. TRAINA: Mr. Chairman, I would now like to call Mr. Billy H. Adams, who is with the EPA, Athens, Georgia.

BILLY H. ADAMS, CHIEF
ENGINEERING SERVICES BRANCH
SURVEILLANCE AND ANALYSIS DIVISION
ENVIRONMENTAL PROTECTION AGENCY
ATHENS, GEORGIA

MR. ADAMS: Mr. Chairman, conferees, ladies and gentlemen.

I am Billy H. Adams, Chief, Engineering Services Branch, Surveillance and Analysis Division, Environmental Protection Agency, Athens, Georgia.

Mr. Chairman, although I do not intend to read the entire Federal report containing an evaluation of waste treatment at Container Corporation of America's paper mill at Brewton, I request that the entire report be entered into the record.

MR. WHITE: It will be entered into the record, without objection, as if read.

(The above-mentioned report follows:)

CONTAINER CORPORATION OF AMERICA
BREWTON MILL

CONECUH-ESCAMBIA RIVER BASIN

STUDY II

Environmental Protection Agency
Surveillance and Analysis Division
Region IV
Atlanta, Georgia

November 1971

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INTRODUCTION

This report contains an evaluation of waste treatment at Container Corporation of America's (CCA) Integrated Pulp and Paper Mill located at Brewton, Alabama. The two-week study, conducted during June-July 1971 by the Environmental Protection Agency (EPA), was prompted by 1970 enforcement action. The study was designed to determine the volume of carbonaceous waste generated by increased production, evaluate treatment efficiency and qualify any relative changes in water quality in the Conecuh-Escambia River below CCA's discharge.

This is the third Federal report containing data relative to carbonaceous waste discharges from Container Corporation's Brewton mill. The first study was conducted during September-October 1969 in response to a request from the Governor of Florida to the Federal Water Pollution Control Administration[1] Southeast Region for technical assistance in evaluating interstate and intrastate pollution in Escambia River and Bay. Results of the study were contained in a report entitled Effect of Pollution on Water Quality, Escambia River and Bay, Florida and served as Federal evidence of pollution in a January 1970 enforcement conference called to consider the matter of pollution of interstate and intrastate water in Escambia River and Bay. The report identified Container Corporation's Brewton Mill as the major point source of carbonaceous wastes discharged into the Conecuh-Escambia River from waste sources in Alabama. Conference recommendation included the removal of 90 percent of the carbonaceous waste generated at the

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[1] Now the Environmental Protection Agency.

Brewton Mill. At a February 1971 reconvened conference, following a detailed study (August 1970) of waste loads before and after treatment, the conferees recommended that CCA's daily discharge be limited to 4,850 pounds of 5-day Biochemical Oxygen Demand (BOD_5). This progress report contains the status of survey finding with regard to conference recommendations and compares study results with previous findings.

The cooperation and contribution of Container Corporation's mill management during the study are gratefully appreciated. Particular acknowledgements are due to personnel of the mill's Technical Engineering Section.

SUMMARY

Container Corporation of America's integrated pulp and paper mill at Brewton, Alabama has increased average mill production from 900 to 1,050 tons per day. Accompanying this increased production was the addition of a 22-acre aeration basin housing ten-75 horsepower aerators. With the addition of the aeration basin, treatment units in operation at the time of the June 1971 survey included a clarifier, liquid oxygen applicator, oxidation pond, and ponding in six natural lakes. Time of travel for the 17.2 million gallons per day (MGD) of unbleached pulp processing waste routed through this complex of treatment units was approximately 4.8 days. Bleachery waste and woodyard drainage amounting to some 17.3 MGD receive treatment through the system of natural lakes only. The success of the pollution abatement program initiated by CCA is clearly demonstrated by the following comparison of results from the August 1970 and June 1971 studies:

		August 1970	June 1971
1.	Average wastewater volume	32 MGD	34.5 MGD
2.	Average untreated BOD_5 load	44,500 lbs/day	28,200 lbs/day
3.	Average BOD_5 discharge to the Conecuh River	8,500 lbs/day or a population equivalent of 49,000	2,220 lbs/day or a population equivalent of 13,100
4.	Reduction of BOD_5 through facilities including the system of natural lakes	81%	92%

	August 1970	June 1971
5. Average untreated Total Organic Carbon (TOC) load	67,500 lbs/day	50,500 lbs/day
6. Average TOC discharge to the Conecuh River	20,800 lbs/day	15,200 lbs/day
7. Reduction of TOC through treatment facilities including natural lakes	69%	70%
8. Average untreated Chemical Oxygen Demand (COD) load	Not Determined	205,500 lbs/day
9. Reduction of COD through treatment facilities, including natural lakes	Not Determined	80%
10. Average COD discharged to the Conecuh River	Not Determined	40,100 lbs/day
11. Suspended solids reduction through treatment facilities, including system of natural lakes	81%	92%
12. Average non-filterable suspended solids discharged to the Conecuh River	9,800 lbs/day	4,860 lbs/day
13. Average non-filterable volatile solids discharged to the Conecuh River	Not Determined	2,730 lbs/day
14. Volatile solids reduction through treatment facilities, including system of natural lakes	Not Determined	92%
15. Average color in discharge to the Conecuh River	410 Pt-Co units	325 Pt-Co units
16. Range of parameters observed in Conecuh-Escambia River below the CCA discharge (Station Nos. CO-6 & E-9)	D.O.-6.4 to 7.4 mg/l pH-6.1 to 7.2 Temp.-23.5 to 30.0°C Color-40 to 60	6.9 to 7.1 mg/l 6.9 to 7.0 27.7 to 27.9 10

CONCLUSIONS

1. Additional secondary units placed in operation by Container Corporation have resulted in BOD_5 reductions in excess of the 90 percent recommended by the conferees at the February 1971 Escambia River-Bay Enforcement Conference.
2. Through the implementation of additional secondary treatment and improved in-plant controls, Container Corporation has reduced the discharged effluent to less than half the 4,850 pounds per day limit established by conference recommendations.
3. Container Corporation has not complied with the conference recommendation that bleach plant and woodyard wastes be provided secondary treatment.
4. All waste loadings measured at the Brewton Mill were reduced as a result of additional pollution abatement.
5. Woodyard wastes are the largest source of non-filterable suspended and volatile solids discharged to the system of natural lakes.
6. Seventy percent of the color in the wastes flowing into the system of natural lakes are the result of bleach plant discharges.
7. Although corrective measures have improved treatment efficiency and drastically reduced waste discharges, additional reductions can be achieved by:
    - Providing additional treatment to bleach plant and woodyard wastes;
    - Eliminating short circuiting in the aeration basin and oxidation pond.

8. Although Container Corporation has not directed treatment toward color reduction, color in the effluent was less intense than that observed in previous surveys and there was not a noticeable change in color in the Conecuh River above and below the point of CCA's discharge.

9. Except for naturally occurring low pH values in study area tributaries (Murder, Franklin Mill, Little Escambia and Big Escambia Creeks) and elevated BOD_5 in Big Escambia Creek, parameters measured indicated that water in Conecuh-Escambia River tributaries were of relatively good quality.

STUDY AREA

CONTAINER CORPORATION OF AMERICA

Container Corporation of America's mill at Brewton, Alabama, is located in the Conecuh-Escambia River drainage basin (Figure 1). The integrated Kraft pulp and paper mill processes an average of 1,050 tons per day of pulp, of which 900 tons per day are from wood chips and the remainder bought paper for recycling. Approximately half of the pulp produced is bleached. Expansion plans include increasing wood chip pulping capacity to 1,050 pounds per day in March 1972.

Waste treatment facilities consist of a clarifier, liquid oxygen applicator, aeration basin, oxidation pond and Franklin Mill Creek plus swamp and natural system of 6 lakes. The aeration basin was placed in operation during October 1970; however, operational difficulty delayed continuous operation until January 1971. Figure 2 contains a schematic of waste treatment plus supplimentary information about each treatment unit.

All wastes do not receive the same degree of treatment. Unbleached pulp process wastes are routed through the entire treatment system; however, bleach plant and woodyard wastes are conveyed via Franklin Mill Creek to the swamp and natural lake system. Mill sanitary wastes are routed into the clarifier and serve as the only source of nutrients to the treatment system. Mill wastes are discharged into the Conecuh River at a point approximately 2.7 miles above the Alabama-Florida State line.

Color removal is presently being investigated; however, no additional

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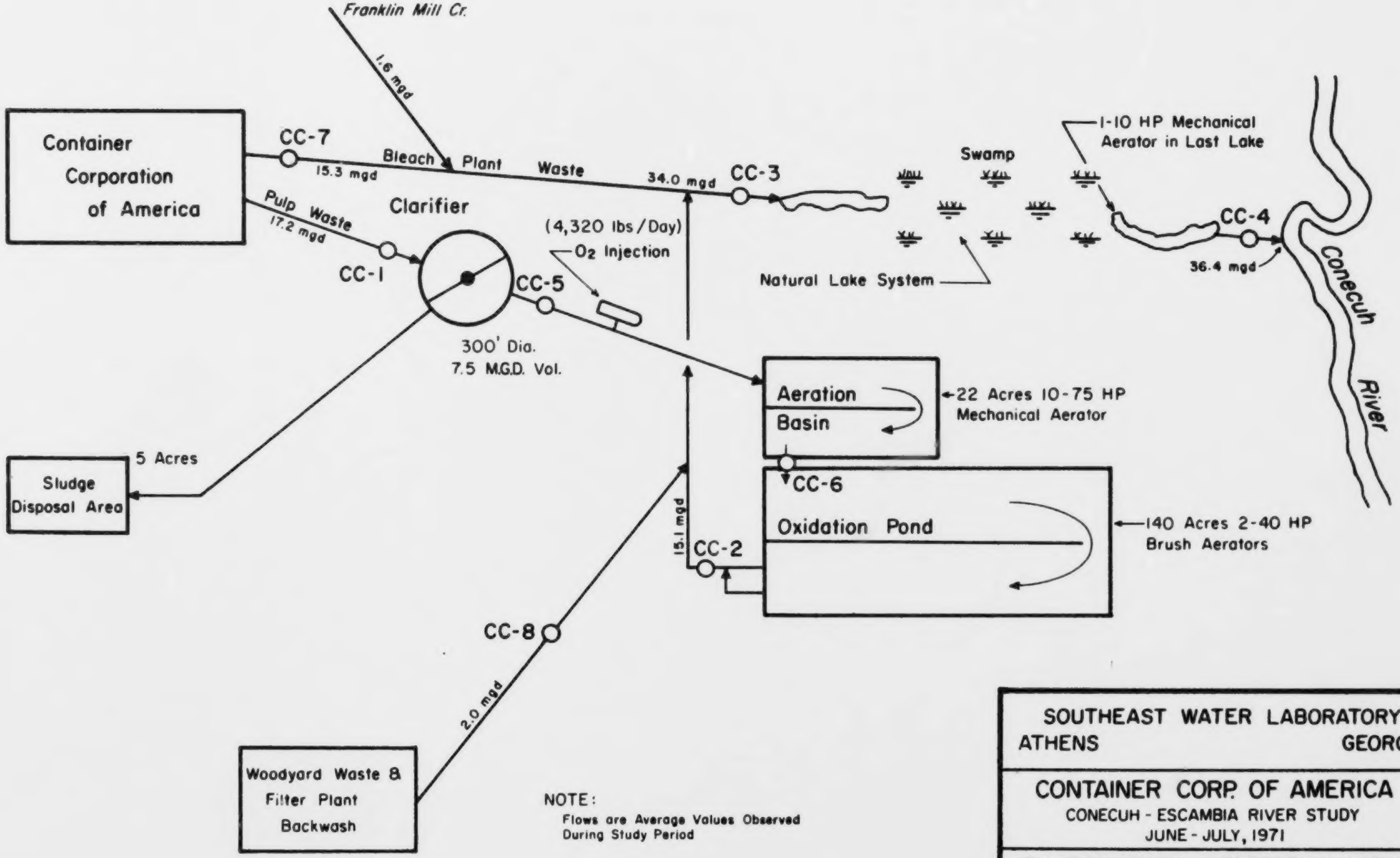
WASTE TREATMENT SCHEMATIC
BREWTON MILL



NOTE:
Flows are Average Values Observed
During Study Period

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

CONTAINER CORP. OF AMERICA
CONECUH - ESCAMBIA RIVER STUDY
JUNE - JULY, 1971

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
SOUTHEAST REGION ATLANTA, GEORGIA

treatment improvements are scheduled for any phase of Container's treatment facility.

CONECUH-ESCAMBIA RIVER BASIN

The Conecuh-Escambia River rises near Union Springs, Alabama, and terminates its south-southwestward journey in Escambia Bay at Pensacola, Florida. The total drainage area of the Conecuh-Escambia River Basin is 4,132 square miles. The Conecuh River and its tributaries in Alabama drain an area of approximately 3,817 square miles.

Streams within the basin flow through wooded areas, are generally shallow with relatively swift currents, and contain the usual natural debris found in waters traversing wooded lands. Major tributaries to the Conecuh-Escambia River in the vicinity of the study area include Murder, Little Escambia, and Big Escambia Creeks. The Conecuh River serves as a source of process water for Container Corporation. Other direct uses of the river and its tributaries, excluding fish and wildlife uses, are for waste disposal. Murder Creek receives industrial wastes from T. R. Miller Company and treated and untreated municipal wastes from Brewton and East Brewton, respectively. Big Escambia Creek also receives effluent from the waste stabilization pond at Flomaton, Alabama. Little Escambia Creek traverses the Pollard Oil Field; however, previous studies have shown the water is of relatively good quality.

Escambia Bay, the recipient of wastes discharged into the Conecuh-Escambia River Basin, has a continuous record of massive fish kills. Although many factors which cause water quality degradation in the bay have been documented, other contributing causes and the triggering mechanism are still questionable and are undergoing investigation. The study of waste discharges into receiving waters of the Conecuh-Escambia drainage system and water quality in these surface waters near the Alabama-Florida state line are a portion of the ongoing investigations.

WATER QUALITY STANDARDS

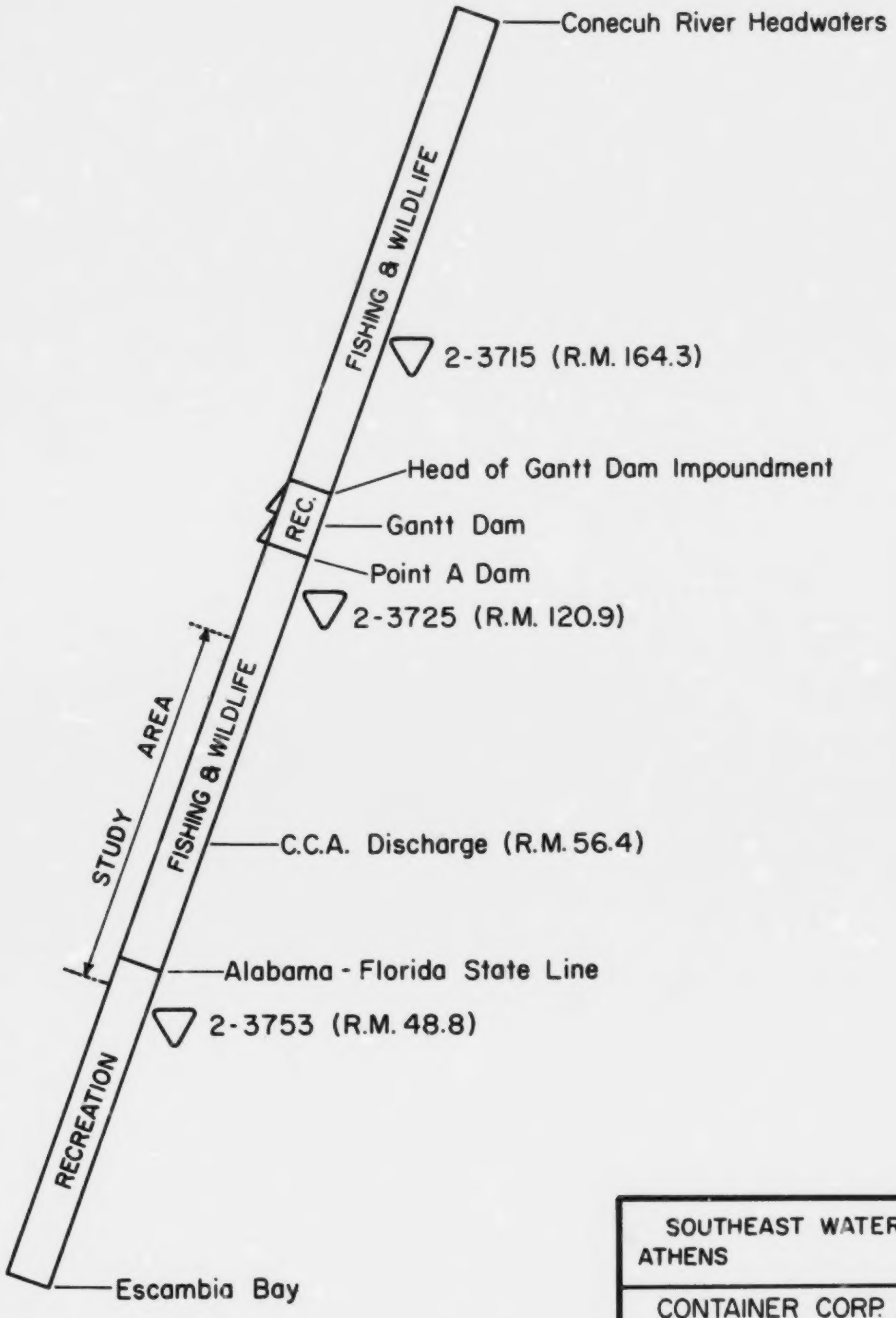
Since the Conecuh-Escambia River originates in Alabama and terminates in Florida, it is classified as an interstate stream. Study area tributaries--Big Escambia and Little Escambia Creeks--are also interstate streams by the same definition. Murder Creek, the other major tributary in the immediate study area, is an intrastate stream since it originates and terminates in Alabama.

The Conecuh-Escambia River is classified for recreation and/or fish and wildlife uses. Figure 3 shows the Conecuh-Escambia River use classifications established by Alabama and Florida. In the Alabama portion of the study area, the Conecuh River, Big Escambia Creek, Little Escambia Creek and Murder Creek are classified for fish and wildlife uses. In the Florida portion of the study area, the Escambia River, Big Escambia Creek and Little Escambia Creek are classified as Class III waters, waters suitable for recreation and the propagation and management of fish and wildlife.

Specific criteria originally adopted by the Alabama Water Improvement Commission has not been accepted by EPA and is presently being revised. The State of Florida has also been notified by EPA that their criteria are no longer acceptable and that revisions will be required. However, the new criteria requirements have not been finalized. Table I contains specific water quality criteria presently adopted by the two states which pertain to the two use classifications.

FIGURE 3

WATER USE CLASSIFICATION
CONECUH - ESCAMBIA RIVER



SCALE 1" = 9.6 MI.

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

CONTAINER CORP. OF AMERICA
CONECUH - ESCAMBIA RIVER STUDY
JUNE - JULY, 1971

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
SOUTHEAST REGION ATLANTA, GEORGIA

Table I

Alabama and Florida Adopted Water Quality Criteria
Conecuh-Escambia River Use Classifications

	Specification	
Item	*Alabama*	*Florida*
Temperature	*Max. 93°F (10°F Rise)*	*Insufficient to damage aquatic life, vegetation, or intefere with classified uses.*
Dissolved Oxygen	*≧4.0 mg/1*	*≧4.0 mg/1*
pH	*6.0 to 8.5*	*6.0 to 8.5*
Bacterial	*Not Specified*	*Monthly Avg.≦1,000/100* *Daily Value ≦2,400/100*
Turbidity	*Not Specified*	*≦50 JTU above background*
Toxic Susbstances	*≦1/10 48 hours TLM*	*Free from substances toxic or harmful to humans, animals, or aquatic life*
Taste, odor and color producing substances	*No amount that will injure fish and aquatic life, impair marketability palatability or unreasonably affect the aesthetic use value*	*No amount sufficient create a nuisance*

Study Program

At the second session of the February 1971 Escambia Bay Enforcement Conference, recommendations required Container Corporation to reduce its BOD_5 by 90 percent and established a maximum effluent waste load of 4,850 pounds per day. Also included in the recommendation was an evaluation of increased pulping capacity on BOD_5 discharges.

An evaluation of Container Corporation's waste abatement facility and the relative effect of the waste discharge upon water quality in the Conecuh-Escambia River was conducted during the weeks of June 20 and 27, 1971. The mill survey was designed to determine the volume of wastes generated by increased product production and to determine the effectiveness of the improvement in treatment following the addition of a 22-acre aeration basin after the August 1970 field study. Eight influent and effluent sampling sites located at each treatment unit were sampled to determine treatment effect on BOD_5, TOC, COD, color, solids, pH and temperature. Stream samples were collected from 7 sampling locations within the immediate basin area and analysed for parameters that would reflect any relative changes in water quality below the mill discharge. Both in-plant and stream sampling locations are shown in Table II. Other chemical sampling included sampling of the oxidation pond for dissolved oxygen fluctations and bleachery waste for polychlorinated biphenols (PCB's) content.

Dye tracer studies were conducted to demonstrate time of travel throughout the entire treatment system. Water quality data was supplemented by flow measurements at both in-plant and stream sampling stations.

Table II

Sampling Station Number and Location
Brewton Paper Mill and
Conecuh-Escambia River System

In-Plant Stations

CC-1	Clarifier influent
CC-5	Clarifier effluent
CC-6	Aeration basin discharge
CC-2	Oxidation pond outlet
CC-7	Bleach plant waste at sewer line discharge
CC-8	Woodyard waste prior to dilution with oxidation pond discharge
CC-3	Franklin Mill Creek spillway below junction of all mill wastes
CC-4	Brewton Lake discharge 200 yards upstream from Conecuh River (RM 56.4)

Conecuh-Escambia River System Stations

CO-5	Conecuh River at Alabama Highway 41 bridge (Edwards Bridge) near Brewton, Alabama (RM 67.10).
CO-6	Conecuh River at Pollard boat landing located approximately two miles downstream from the Brewton Lake discharge.
M-11	Murder Creek at Container Corporation's process water intake located near the mouth of Murder Creek.
LE-7	Little Escambia Creek at U. S. Highway 31 bridge near Pollard, Alabama.
BE-8	Big Escambia Creek at Escambia County road near Century, Florida.
E-9	Escambia River at Florida Highway 4 near Century, Florida (RM 48.80).
FM-10	Franklin Mill Creek at U. S. Highway 31 bridge at Brewton, Alabama.

STUDY FINDINGS

GENERAL DISCUSSION

Climatologic conditions within the Brewton area were seasonal and almost constant. Average high temperatures were 95.9°F, 2 degrees above normal.[1/] Precipitation was almost nil within the Brewton area except for a few scattered showers the latter part of the second week. Flows in Murder Creek and the Conecuh-Escambia River showed increases the second week from precipitation north of Brewton.

The Escambia River at Century, Florida has a drainage area of 3,817 square miles and a 37-year average daily discharge of 5,952 cubic feet per second (cfs) with extremes from 596 cfs to 77,200 cfs. The seven-day, 10-year low flow is 785 cfs. The U. S. Geological Survey gaging station at Century, Florida reports the average flow in the Escambia River at Century for the two-week study period was 2,560 cfs. Little Escambia, Franklin Mill and Murder Creeks were gaged and referenced with tape downs to establish rating curves. Big Escambia Creek was not gaged because of water depth. Existing flumes and weirs were used for in-plant flow measurements at sampling stations CC-1, CC-5, CC-6, and CC-7. The discharge at station CC-8 was formulated from water treatment plant usage records. The flow at Station CC-2 was calibrated and continuously measured with Stevens recorders. The Brewton Lake discharge (CC-4) was stream gaged and assumed to be constant because of physical conditions.

[1/] U. S. Department of Commerce, Climatological Data, Alabama, June 1971, Volume 77 No. 6.

CONTAINER CORPORATION'S TREATMENT EVALUATION

Comparison of 1970 and 1971 Study Results

With the addition of a 22-acre aeration basin, the average BOD_5 removal efficiency of the treatment system at the Brewton Mill improved from 81 percent to 92 percent.[1] Corresponding TOC reductions showed no significant improvement -- 69 percent removal for 1970 compared to 70 percent removal this year. The TOC analyses added to the 1971 study indicated an overall removal rate of 80 percent. Color in the effluent was 85 units lower than that observed during the 1970 survey. The step reduction in these parameters through the treatment system are summarized in Table III, and Table IV contains a summary of waste treatment loads. All water quality data are presented in Appendix E.

Physical and Chemical Data

During the study period, the volume of waste in the mill effluent was 34.5 million gallons per day (MGD). Waste flow from the bleach plant averaged 15.3 MGD and pulp processing waste averaged 17.2 MGD. The flow from the woodyard operation, including water plant filter backwash wastes, average approximately 2 MGD. Although not a product of mill operation, an average flow of approximatley 1.6 MGD in Franklin Mill Creek flows through the swamp and natural lake system. Figure 2 contains average flows observed throughout the treatment system and depicts the effects of seepage and evaporation on the treatment system.

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[1] All comparisons are between CCA field studies of August 1970 and June 1971.

Table III

Waste Treatment Data Summary
Container Corporation of America-Brewton Mill
(June-July 1971)

Station No. & Location	Range	Flow (MGD)	Water Temp. (°C)	pH	Color (PT-CO Units)	BOD$_5$ (mg/l)	TOC (mg/l)	COD (mg/l)	Solids-Non-Filterable	
									Suspended	Volatile
CC-1 Clarifier influent	Max.	--	45.0	9.7	700	270	400	2,670	684	452
	Min.	--	40.5	7.3	125	80	125	547	168	102
	Mean	17.2	43.7	8.6	392	131	205	1,070	319	204
CC-5 Clarifier effluent	Max.	—	44.0	9.4	600	130	165	507	160	88
	Min.	--	39.5	7.1	140	62	60	297	36	29
	Mean	17.2	43.2	8.6	340	98	98	380	88	49
CC-6 Aeration basin effluent	Max.	--	36.0	7.6	200	31	79	233	65	37
	Min.	--	33.0	6.4	120	17	44	130	8	2
	Mean	16.7	35.0	7.2	172	24	60	180	30	17
CC-2 Oxidation pond effluent	Max.	16.1	29.5	8.5	200	13	49	148	104	23
	Min.	14.0	26.5	5.4	120	8	33	107	10	4
	Mean	15.0	28.6	7.5	158	10	40	129	46	10
CC-7 Bleach plant effluent	Max.	—	45.5	3.8	600	84	220	435	54	42
	Min.	--	41.5	2.9	400	34	75	212	8	2
	Mean	15.3	43.5	3.2	500	69	156	369	26	18
CC-8 Woodyard effluent	Max.	--	32.0	7.3	400	44	120	526	884	248
	Min.	--	26.5	5.7	200	24	32	192	196	72
	Mean	2.0	29.4	6.8	291	37	69	326	578	169
CC-3 Franklin Mill Creek @ spillway	Max.	35.0	32.0	6.7	600	45	77	227	68	28
	Min.	32.9	28.5	6.0	200	24	50	143	16	4
	Mean	34.0	30.6	6.3	299	31	64	198	39	15
CC-4 Brewton Lake effluent	Max.	--	28.0	7.5	600	10	57	152	27	14
	Min.	--	19.5	7.0	200	5	44	60	6	4
	Mean	36.4	24.6	7.2	325	7	50	132	16	9

Table IV

Summary Waste Treatment Loads (lbs/day)
Container Corporation of America - Brewton Mill
(June-July 1971)

Station No. & Location	BOD*	TOC*	COD*	Solids, Non-Filterable Suspended*	Solids, Non-Filterable Volatile*
CC-1 Clarifier influent	18,800	29,400	153,000	45,800	29,300
CC-5 Clarifier effluent	14,100	14,100	54,500	12,600	7,030
CC-6 Aeration basin effluent	3,310	8,360	25,100	4,180	2,370
CC-2 Oxidation pond effluent	1,310	5,000	16,200	5,760	1,250
CC-7 Bleach plant effluent	8,750	19,900	47,100	3,320	2,300
CC-8 Woodyard effluent	620	1,150	5,440	9,640	2,820
CC-3 Franklin Mill Creek @ spillway	8,900	18,100	56,100	11,100	4,250
CC-4 Brewton Lake effluent	2,220	15,200	40,100	4,860	2,730

* Denotes mean values.

Although average production was 150 tons per day higher than last year's 900 tons per day, the average untreated BOD_5 load generated decreased from 44,500 pounds per day to 28,200 pounds per day. Reduction by in-plant controls, coupled with a treatment reduction of 92 percent, produced an average effluent BOD_5 of 2,220 pounds per day or a discharge equivalent to that from a human population of 13,100.1/ A BOD_5 reduction of 25 and 83 percent were noted in the pulp process waste routed through the clarifier and aeration basin, respectively. The average BOD_5 load in the oxidation pond effluent showed a discharge of 1,310 pounds per day, an overall reduction of 93 percent. Average BOD_5 reductions throughout the treatment system are shown in figure 4.

The untreated TOC load generated by the mill was down from last year's 67,500 pounds per day to 50,500 pounds per day. Neither this reduction nor the addition of the aeration basin noticeably affect the TOC removal rate. An average TOC load of 15,200 pounds per day was discharged to the Conecuh River (Figure 5). This represents a 5,600 pound per day decrease from 1970. It should be noted that only the pulp wastes are conveyed to the aeration basin, whereas the bleach plant wastes are discharged untreated to the system of natural lakes. The average daily TOC discharge from the bleach plant is 19,900 pounds. Results from the 1970 study showed that the TOC in the pulp processing wastes received an 84 percent reduction in the clarifier and oxidation pond. With the addition of the aeration basin to this treatment, the TOC reduction was 83 percent.

Brewton Mill BOD/TOC regression analyses expressed as percent

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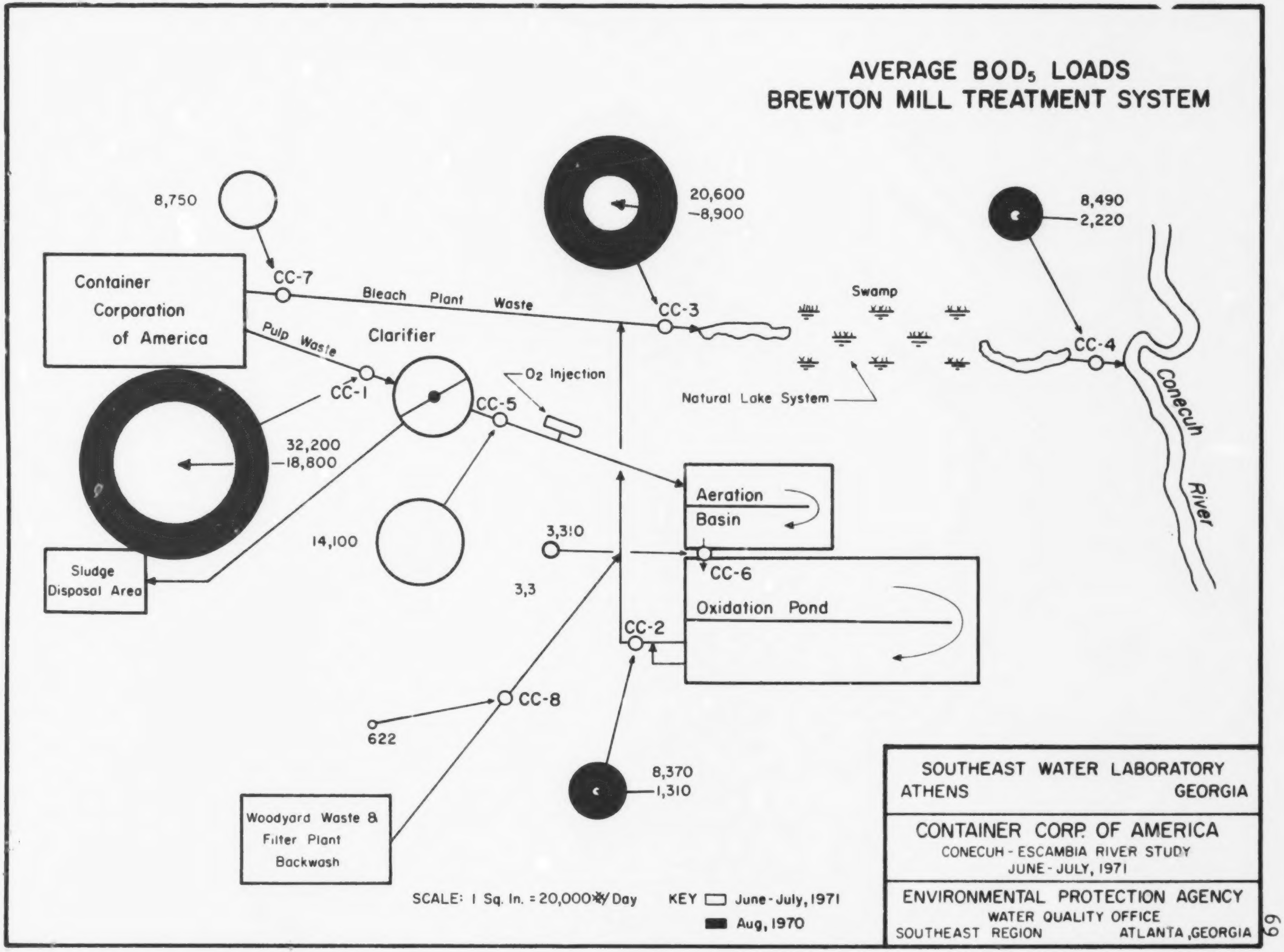
1/ One population equivalent = 0.17 pounds per capita per day.

'URE 4

AVERAGE BOD$_5$ LOADS
BREWTON MILL TREATMENT SYSTEM



SCALE: 1 Sq. In. = 20,000#/Day

KEY ☐ June-July, 1971
■ Aug, 1970

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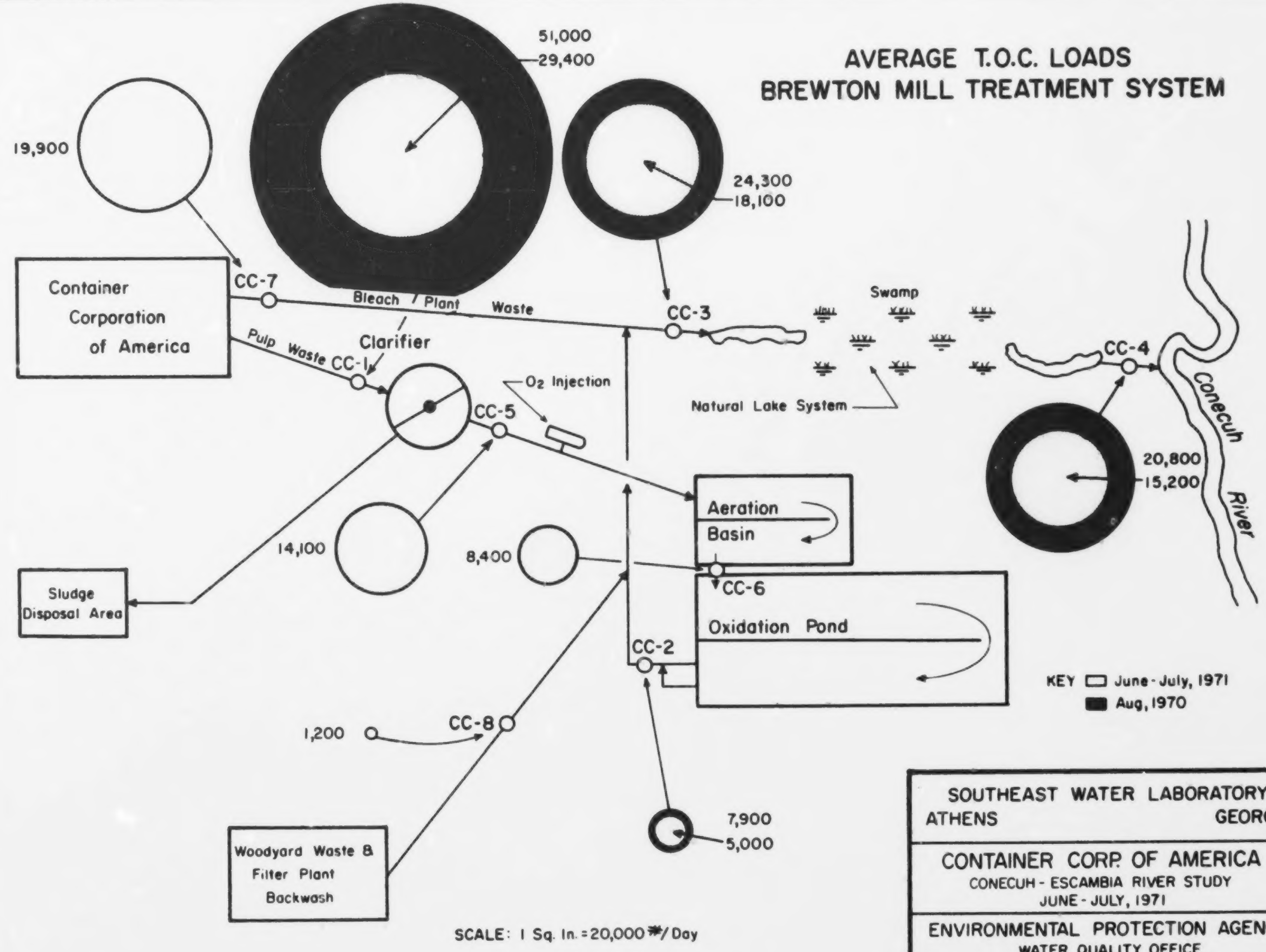
F JRE 5

AVERAGE T.O.C. LOADS
BREWTON MILL TREATMENT SYSTEM



KEY ☐ June - July, 1971
■ Aug, 1970

SCALE: 1 Sq. In. = 20,000 #/ Day

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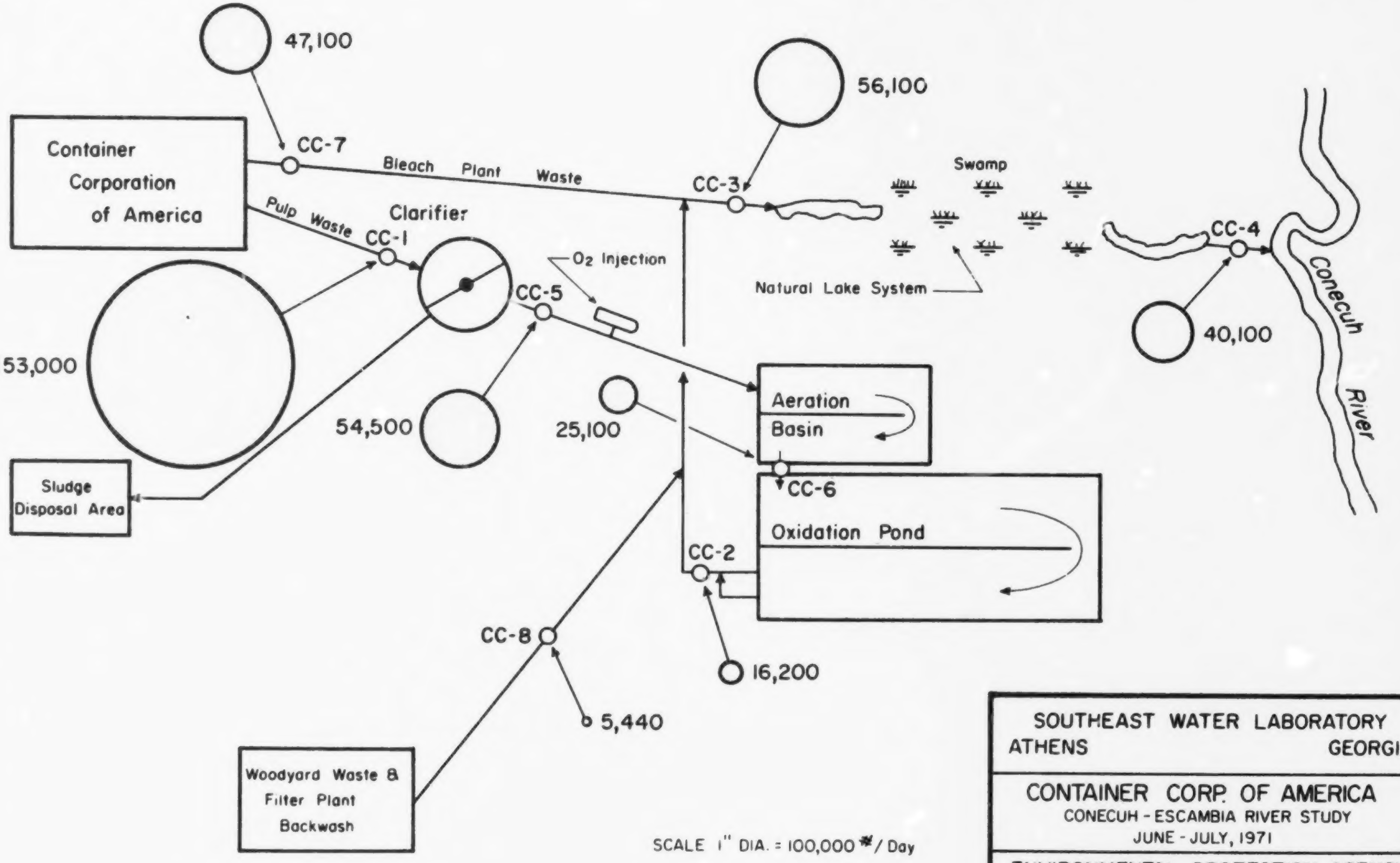
BOD removed showed approximately a 1 to 1 removal rate for TOC as a function of BOD between the 25 percent to 75 percent removal range. These were computed from the August 1970 data. Above 75 percent removal, the inherent differences in TOC and BOD are very relevant and no relationship is seemingly available. For example, at Brewton Lake discharge, after approximately 5 days retention, the BOD/TOC regression line shows a constant slope which indicates no change in TOC for varying BOD concentrations. This same relationship was apparent with the addition of the aeration basin.

Although the 1970 study did not include a COD analysis, samples collected during the 1971 study showed that the daily waste generated contained 205,500 pounds of COD. The daily effluent from pulp processing, bleach plant and woodyard contained 153,000, 47,100, and 5,440 pounds of COD, respectively. The overall COD reduction through the treatment system was 80 percent. The COD reduction through the aeration basin and oxidation pond were 84 percent and 89 percent, respectively. The system of natural lakes removes about 29 percent of the COD in the influent; however, the daily discharge into the Conecuh River still contains 40,100 pounds. Figure 6 shows the average COD reduction throughout the treatment system.

The non-filterable suspended solids removal at the Brewton Mill was 93 percent. The average daily discharge to the Conecuh River contained 4,860 pounds of suspended solids, a 10,270 pound per day reduction over the 1970 load. The raw pulp process wastes at the clarifier inlet are the largest source of suspended solids at 45,800 pounds per day. The suspended solids load in the effluent from the clarifier was 12,600 pound per day, a removal of 72 percent. Treatment through the aeration basin and oxidation pond results in a overall reduction

URE 6

AVERAGE COD LOADS
BREWTON MILL TREATMENT SYSTEM



SCALE 1" DIA. = 100,000 #/ Day

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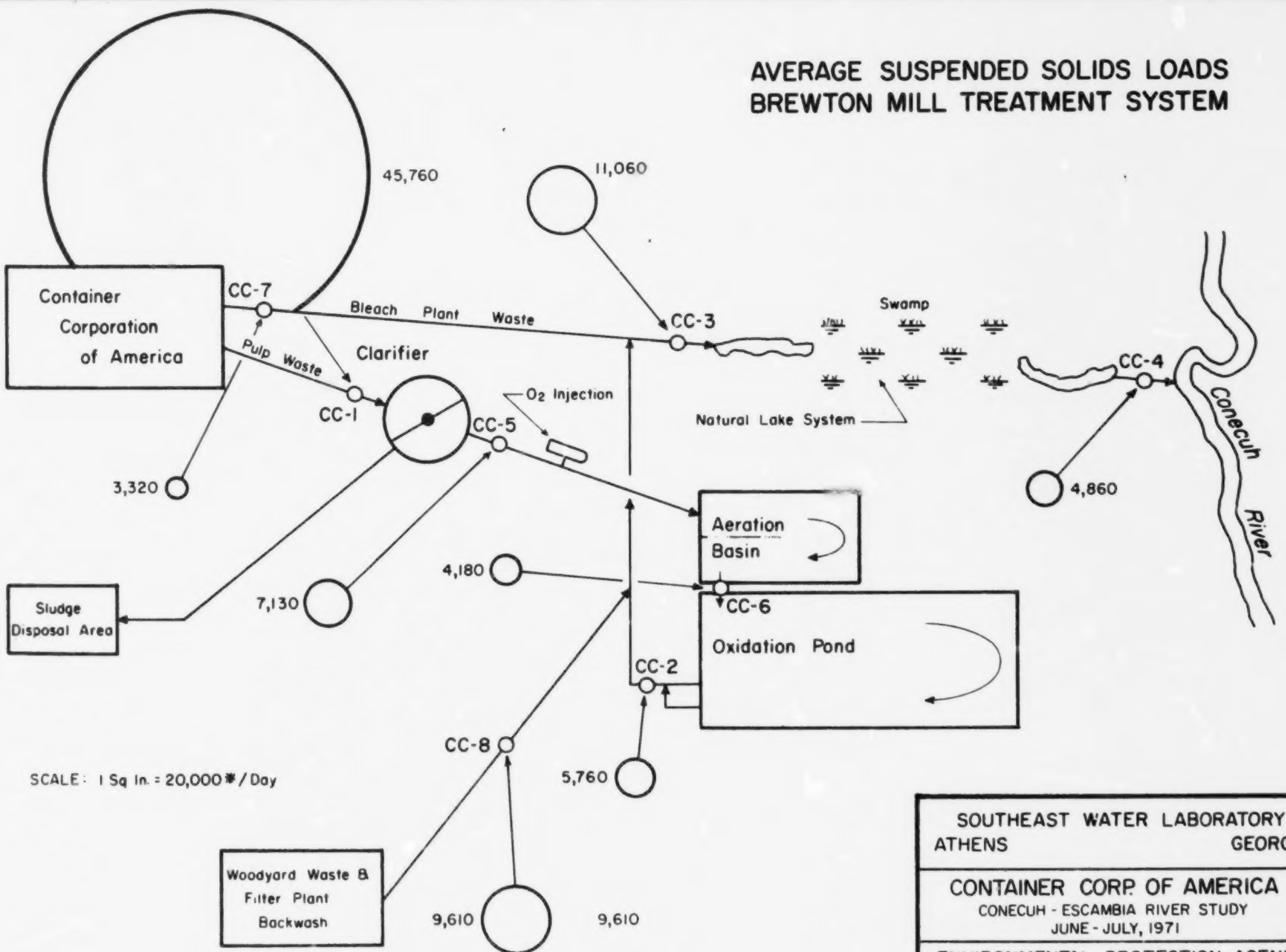
of 88 percent. The oxidation pond effluent contained a suspended solids load of 5,760 pounds per day. The daily oxidation pond effluent contains 1,580 pounds more of suspended solids than the aeration basin effluent. Plankton-algal growth and a seasonal increase in insect larvae and insects probably account for this increased load. The 9,640 pounds per day of suspended solids from the woodyard and filter plant backwash are the largest single source of solids discharged to the system of natural lakes. Prior removal of these solids would appreciably reduce the suspended solids load discharged to the Conecuh River. Bleach plant waste contained only 3,320 pound of suspended solids. Figure 7 illustrates the average suspended solids load for each sampling site in the treatment process.

The mill discharge to the Conecuh River contains 2,730 pounds per day of non-filterable volatile solids. This load represents a 92 percent reduction in the total volatile solids produced from the three waste sources. The daily discharge from pulp processing, bleach plant and woodyard operation contained 29,300, 2,300 and 2,830 pounds of volitable solids, respectively. Average volatile solids in the pulp processing waste was reduced to 1,250 pound per day, a 96 percent reduction, by treatment through the man-made system. Average volatile solids loads for each sampling site are contained in Table III.

There is no direct method for removing color employed at the Brewton Mill. Figure 8 illustrates the color concentrations at each in-plant sampling station. There was a slight increase in color as the wastes flowed through the system of natural lakes. At the Franklin Mill Creek sampling site (CC-3), where all wastes have mixed, the color was 299 units, of which 70 percent was from the untreated bleach plant wastes. The average color concentration in the discharge to the Conecuh River

I JRE 7

AVERAGE SUSPENDED SOLIDS LOADS
BREWTON MILL TREATMENT SYSTEM



SCALE: 1 Sq In. = 20,000 # / Day

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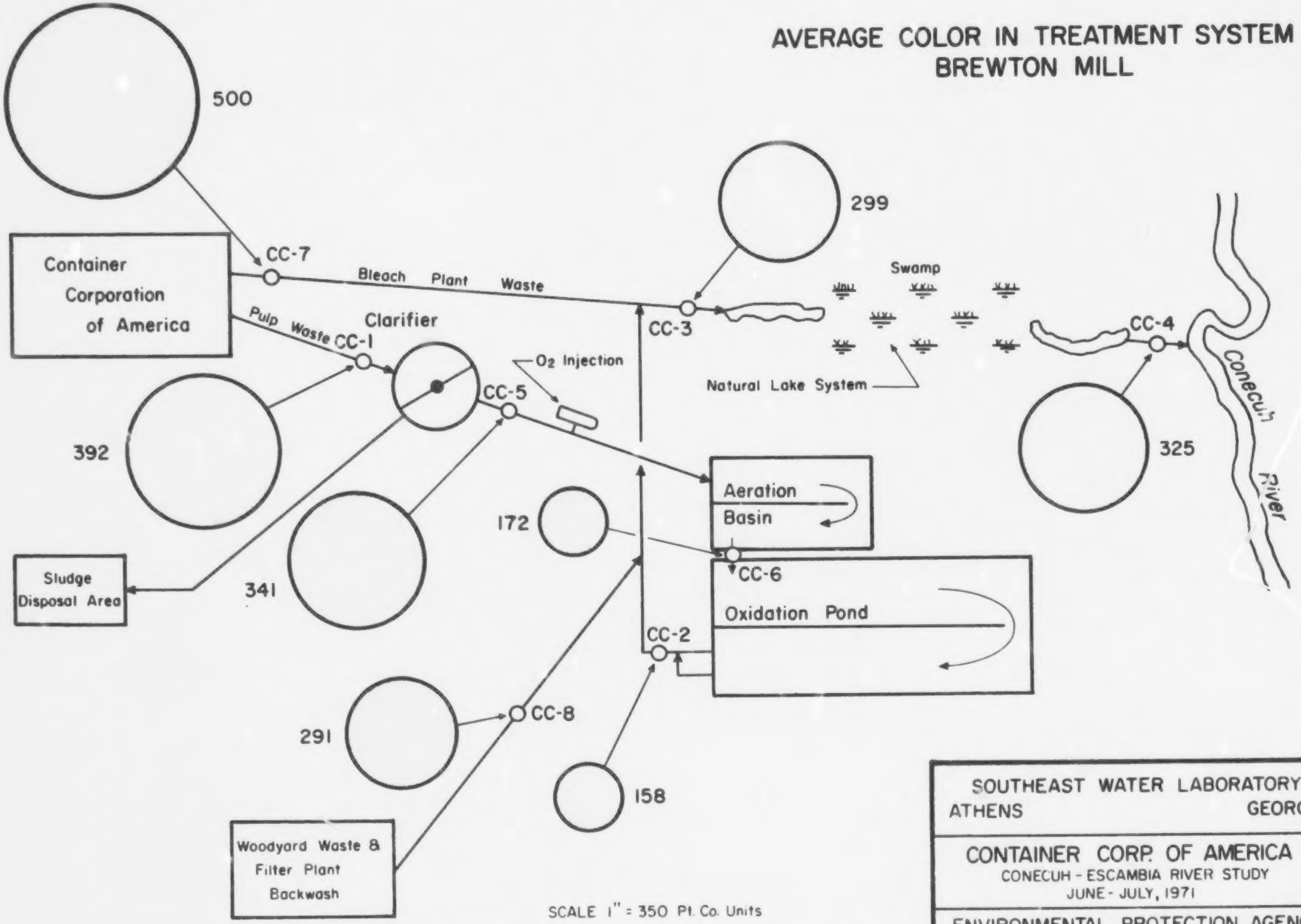
AVERAGE COLOR IN TREATMENT SYSTEM
BREWTON MILL



SCALE 1" = 350 Pt. Co. Units

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was 325 units.

Samples collected from the bleach plant at Brewton Lake were analyzed for polychlorinated biphenols (PCB's); however, PCB's were not detected in the effluent.

Special Studies

A diurnal study to show dissolved oxygen fluctuations in the 140-acre oxidation pond was performed June 23 and 24. Figure 9 exhibits the extremely high dissolved oxygen concentrations in the shallow pond. A large plankton-algal population existed which produced dissolved oxygen concentrations in the pond effluent near or above the saturation point at all times. Dissolved oxygen in surface samples varied from 2.8 to 18.0 mg/l, while dissolved oxygen in bottom samples ranged from 3.0 to 12.0 mg/l.

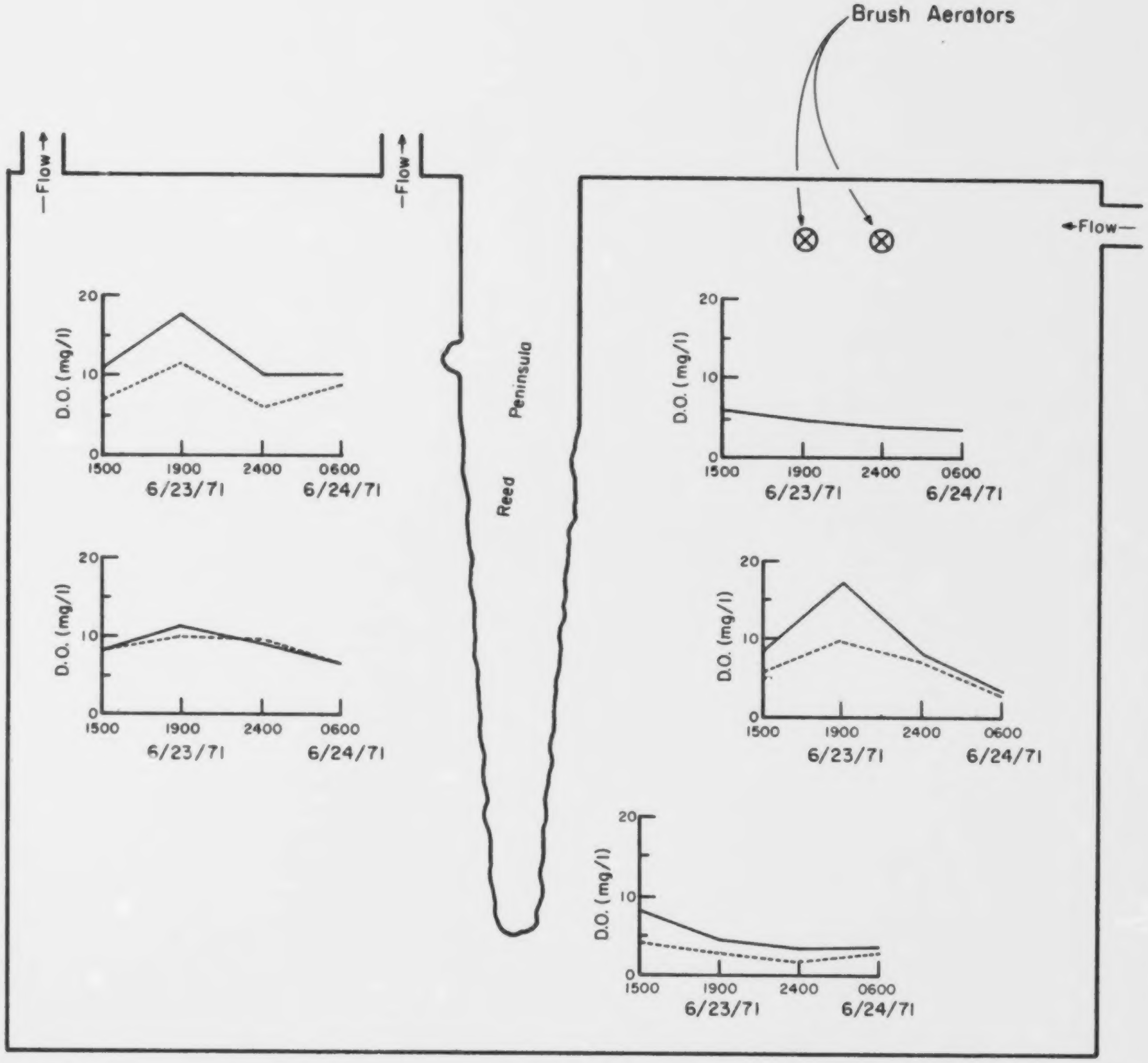
Dye studies were used to demonstrate the retention time of pulp process wastes in the aeration basin and oxidation pond and the time of travel of wastes through the swamp and natural system of lakes. Time of travel studies of the flow of bleach plant wastes to the junction of other wastes were also made.

Dye study procedures are included in Appendix B. The dye studies showed approximate travel times of:

- 26 minutes from the oxygen application nozzle to the aeration basin inlet;
- 6 hours 34 minutes from the aeration basin inlet to outlet;
- 48 hours from oxidation pond inlet to outlet;
- 58 1/2 hours from the bleach plant sewer discharge (cc.7) to the Conecuh River; and
- 4 3/5 days from the clarifier outlet to the Conecuh River.

FIGURE 9

DISSOLVED OXYGEN DIURNAL
BREWTON MILL OXIDATION POND



KEY
— Surface
----- Bottom

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The travel times indicated for dye passage in the aeration basin and oxidation pond were measured from the time of injection until the first dye trace was detected. The remaining travel times were computed from dye peak to dye peak after an instantaneous dye dump. The 4.6 days travel time from the clarifier outlet to the Conecuh River includes an estimated 2-hour travel time from the oxidation pond outlet to the Franklin Mill Creek spillway, station CC-3. This estimate was based on several stream velocity measurements and related travel time studies.

Figure 10 shows the visually observed movement of dye through the aeration basin and the apparent short circuiting. However, there is still enough retention time in the aeration basin to remove 77 percent, 54 percent and 41 percent of the incoming BOD, COD and TOC, respectively. Improvement of these reduction rates is a function of time which depends on increasing the aeration basin's retention time. Two possible remedies are a simple baffle system and re-alignment of the aerators using a better rotation scheme to improve mixing.

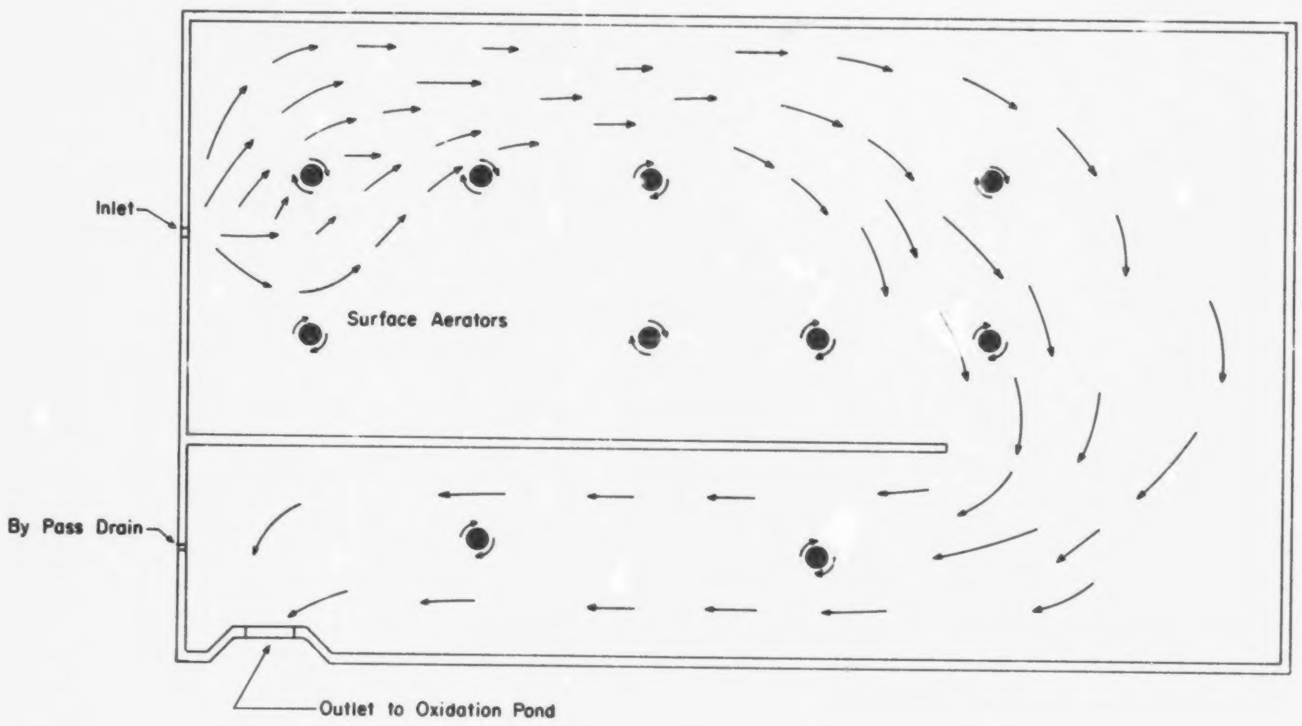
The travel time through the system of natural lakes to the Conecuh River was 53 hours. The 4.9 mile, 6-lake system is severly channeled. The 6 lakes ranging in size from 1.9 acres to 18.6 acres cover an area of 44.6 acres and have a total volume of 129.4 million gallons.

CONECUH-ESCAMBIA RIVER BASIN WATER QUALITY

The water quality parameters analysed on water samples collected from the Conecuh-Escambia River did not show a standard violation. Although flow in the Escambia River at Century was less than half the

URE 10

DYE CIRCULATION
BREWTON MILL AERATION BASIN



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37 year average, there was no appreciable difference in dissolved oxygen, temperature, pH and color at river sampling stations above and below the Brewton Mill discharge. The minimum dissolved oxygen observed in the river was 6.8 mg/l at both Pollard landing and Florida Highway 4 bridge near Century. The minimum dissolved oxygen at Edwards Bridge, assumed to exemplify background conditions, was 7.1 mg/l. The temperature in the river varied from 25° to 30° Centigrade and the pH ranged from 6.5 to 7.2. Color held steady at 10 units at all river sampling stations. There was a noticeable increase in BOD_5 in the Escambia River near Century; however, elevated BOD_5s were also noted in Big Escambia Creek which affects the BOD_5 at Century. Average BOD_5 in the Escambia River at Century was 1.9 mg/l while BOD_5s in the Conecuh River above and below CCA's discharge were 0.8 and 1.0 mg/l, respectively. Total organic carbon, COD, suspended solids and volatile solids ranged from 2 to 10 mg/l, 4.0 to 22.4 mg/l, 2 to 36 mg/l, and zero to 8 mg/l, respectively.

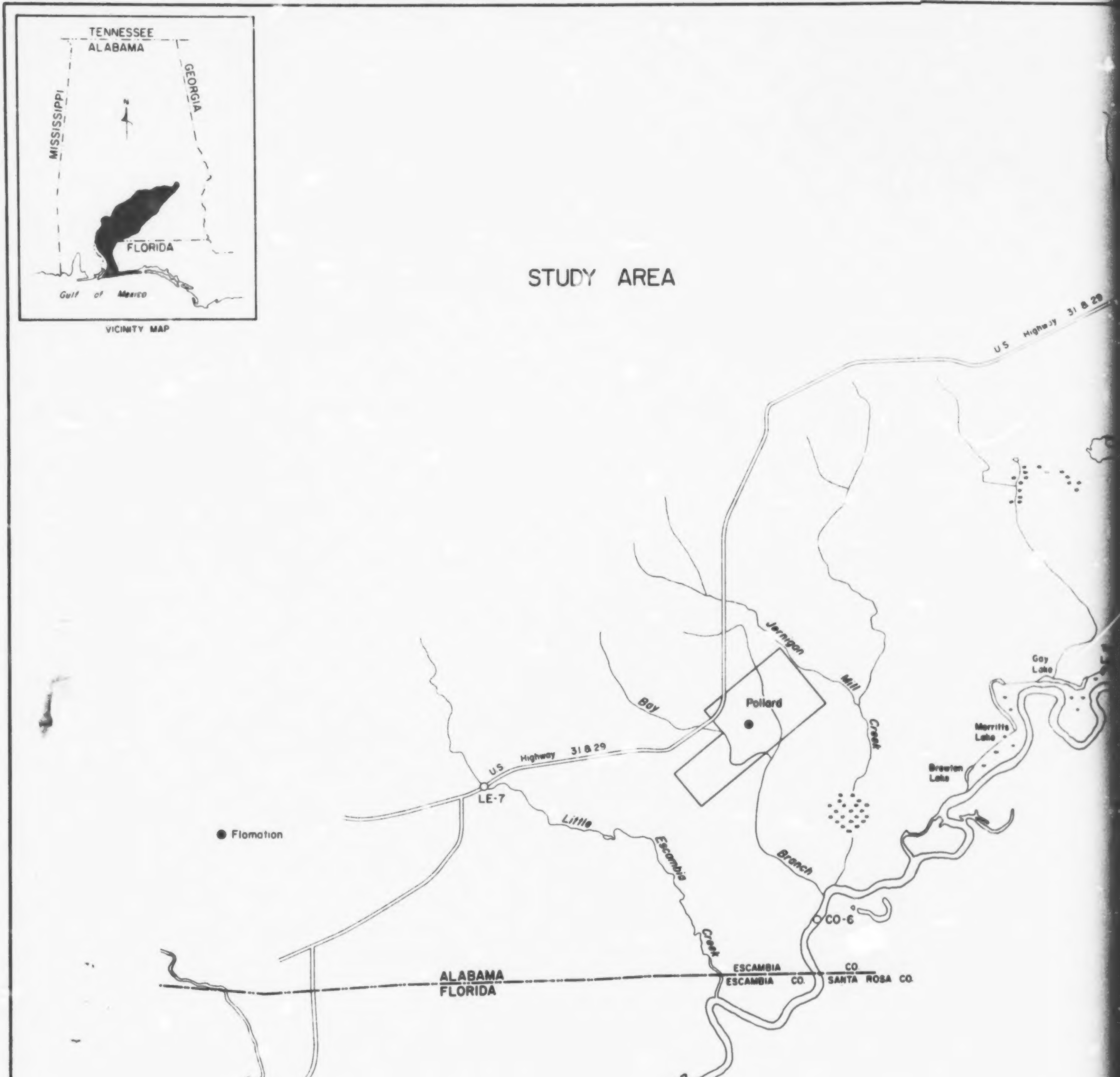
Except for low pH values observed in all tributaries sampled and the elevated BOD_5 in Big Escambia Creek, parameters measured indicate relatively good water quality in the Conecuh-Escambia River tributaries (Table V). The pH in Big Escambia, Little Escambia and Murder Creeks were lower than the limit specified in adopted criteria. Minimum pH values of 5.3, 5.4, 5.5, and 5.6 were observed in Murder, Little Escambia, Franklin Mill and Big Escambia Creeks, respectively. Previous survey sampling of these tributaries above any known point source discharges have also revealed low pH values, and these low values are assumed to be normal for stream in this general area. Although Murder

Table V

Water Quality Data Summary
Conecuh-Escambia River System
(June-July 1971)

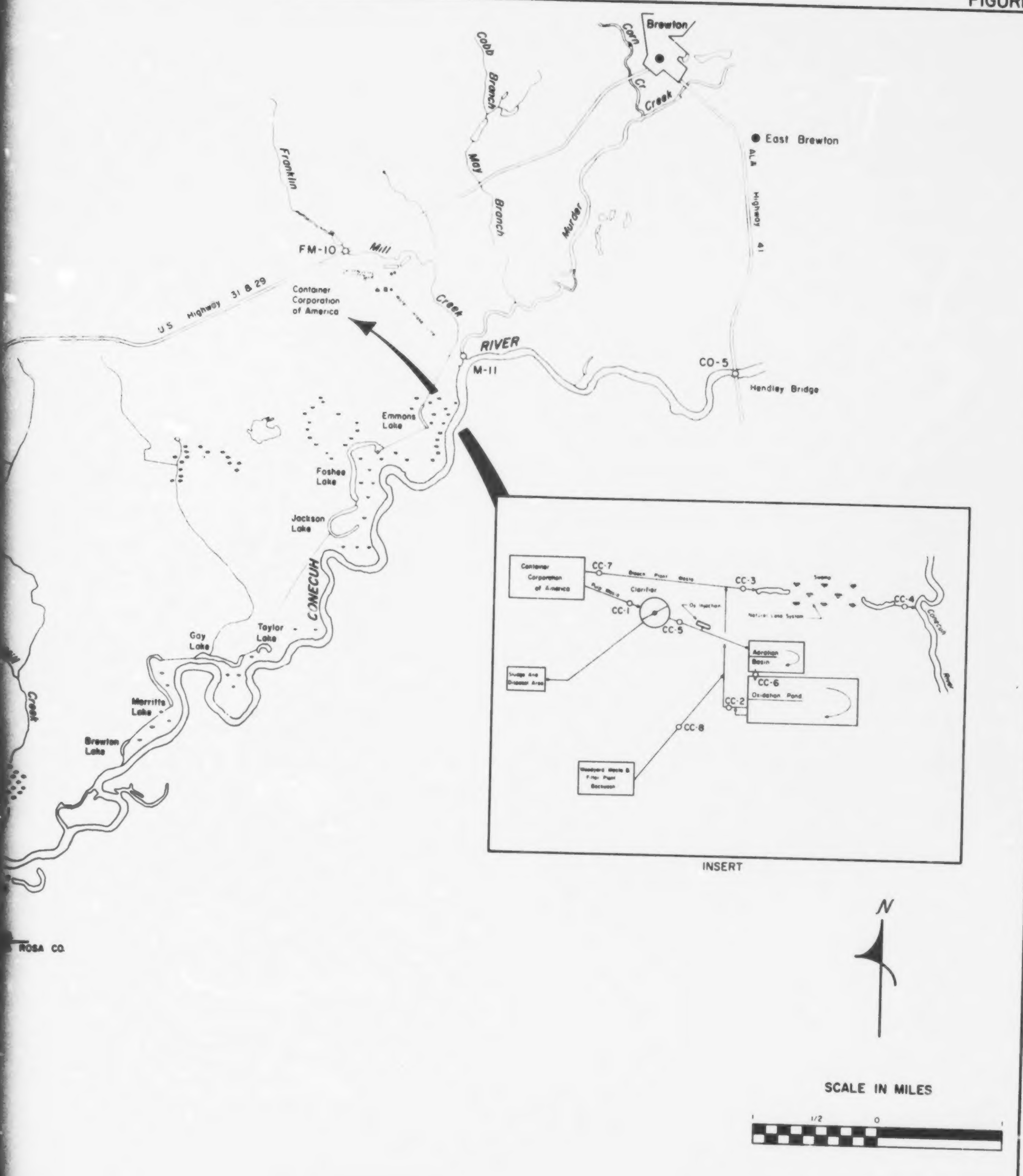
Station No. & Location	Range	Water Temperature	Dissolved Oxygen	pH	Color (PT-Counts)	BOD_5 (mg/1)	COD (mg/1)	TOC (mg/1)	Solids Non-Filterable Suspended (mg/1)	Solids Non-Filterable Volatile (mg/1)
CO-5 Conecuh River at Ala. Hwy 41 near Brewton	Max.	28	7.4	7.2	10	1.1	22.4	5	21	8
	Min.	26	7.1	6.7	10	0.5	4.0	2	2	0
	Mean	27	7.2	6.9	10	0.8	12.2	4	8	3
CO-6 Conecuh River at Pollard boat landing	Max.	30	7.4	7.2	10	1.3	18.3	10	26	8
	Min.	25	6.8	6.5	10	0.7	6.2	4	2	0
	Mean	28	6.9	7.0	10	1.0	13.9	6	11	2
M-11 Murder Creek at CCA's water intake	Max.	26	8.4	7.1	15	1.3	23.2	9	14	4
	Min.	23	7.3	5.3	10	0.3	5.7	3	1	0
	Mean	25	7.7	6.7	11	0.8	13.7	6	7	2
LE-7 Little Escambia Creek at U. S. Hwy 31 near Pollard	Max.	25	8.6	7.0	20	1.1	15.4	6	14	8
	Min.	22	8.1	5.4	10	0.4	6.6	2	2	0
	Mean	24	8.4	6.3	12	0.7	13.0	5	6	2
BE-8 Big Escambia Creek at County road near Century, Fla.	Max.	26	7.5	7.0	10	3.0	19.1	11	12	6
	Min.	24	6.6	5.6	10	0.3	6.7	3	1	0
	Mean	25	7.0	6.3	10	1.6	12.2	5	6	2
E-9 Escambia River at Fla. Hwy 4 near Century	Max.	28	7.3	7.2	10	4.0	21.6	8	36	5
	Min.	26	6.8	6.5	10	0.6	9.6	5	4	1
	Mean	28	7.1	6.9	10	1.9	15.7	6	14	3
FM-10 Franklin Mill Creek at U.S. Hwy. 31 near Brewton	Max.	28	8.5	7.3	10	1.3	16.4	6	27	9
	Min.	21	7.4	5.5	10	0.3	4.1	3	1	0
	Mean	23	8.0	6.3	10	0.8	10.5	4	8	3

Creek receives both treated and untreated wastes, BOD_5 concentrations were similar to those observed in Little Escambia Creek, which does not have any known point sources of organic waste discharges. The average BOD_5 in Murder Creek was 0.8 mg/l and the BOD_5 ranged from 1.3 to 0.3 mg/l. Average BOD_5 in Big Escambia Creek, which receives effluent from the waste stabilization pond at Flomaton, was 1.6 mg/l with ranges from 3.0 to 0.3 mg/l. Table V contains a summary of water quality data from the Conecuh-Escambia River system and Appendix E contains a list of all data.


TENNESSEE
ALABAMA
MISSISSIPPI
GEORGIA
FLORIDA
Gulf of Mexico
VICINITY MAP
STUDY AREA
U.S. Highway 31 & 29
U.S. Highway 31 & 29
Jernigan
Bay
Pollard
Mill
Creek
Branch
Gay Lake
Merritts Lake
Brewton Lake
LE-7
Little
Escambia
Creek
Flomation
CO-6
ESCAMBIA CO.
ESCAMBIA CO.
SANTA ROSA CO.
ALABAMA
FLORIDA
RIVER
ESCAMBIA
Big
Escambia
Creek
BE-8
FLA Highway 4
E-9

B

FIGURE 1



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APPENDIX A

ACKNOWLEDGEMENT

The cooperation and resources extended by Container Corporation to EPA are a fine example of productive government-industry relations. Thanks is expressed to their quick responding electrical crews for immediate hookup and disconnection of our mobile lab; the ever watchful eye of CCA's security force; Technical Section personnel who worked with EPA people seven days a week: John Fay, Technical Superintendent; William Brantley, Project Engineer; Rudy Yuhasz, Shift Supervisor; Larry Croft, Technician; Hilton Howard, Technician; the remaining members of the section, and mill management for their effort in producing a very successful field study.

EPA Field Personnel were:

Dennis Cafaro - Sanitary Engineer

Steve Hall - Sanitary Engineer

Pat Lawless - Chemist

Ray Wilkerson - Hydraulic Technician

Chuck Holland - Co-op Student

APPENDIX B

SAMPLING PROCEDURE AND ANALYTICAL METHODOLOGY

SAMPLING PROCEDURE

Samples were collected for 10 days from 8 in-plant sampling sites and 7 stream sampling locations. Container Corporation personnel assisted in sample collection and all samples were split with the company.

Twenty-four hour composite samples were collected at one hour intervals at all in-plant sampling stations. Parameters analyzed included temperature, pH, color, and BOD_5. Samples to be analyzed for filterable and non-filterable solids, PCB's, COD, and TOC were preserved, if necessary, and returned to the Southeast Water Laboratory at Athens, Georgia for analysis.

All stream samples were collected by the grab sample method once per day, except during the first week when samples from sampling stations E-9 and CO-7 were sampled twice daily. Stream samples were routinely analysed for DO, pH,temperature, color, BOD_5, COD, TOC and filterable and non-filterable solids. All samples were collected at mid-depth since the stream depths were less than 10 feet. Two collection techniques were employed-- DO can sampler and an open bucket. Dissolved oxygen samples were immediately carried to the second step of fixation (addition of alkaline azide) and placed on ice. The remaining sample was poured into two 2-liter containers, placed on ice and at the end of the sample run returned to the mobile laboratory for processing.

ANALYTICAL METHODOLOGY

The following analytical methods were used by EPA personnel:

- pH -- laboratory instrument meter

- Dissolved Oxygen -- modified Winkler with full-bottle technique -- "FWPCA Methods for Chemical Analysis of Water and Wastes," November 1969.

- Total Organic Carbon (TOC) -- single channel instrument, DOW Beckman Carbonaceous Analyzer," FWPCA Methods for Chemical Analysis of Water and Wastes," November 1969.

- Five-Day Biochemical Oxygen Demand (BOD) -- "FWPCA Methods for Chemical Analysis of Water and Wastes," November 1969. (Using only Conecuh River water at Station CO-5 for dilution of in-plant samples.)

- Chemical Oxygen Demand(COD) -- Dichromate Reflux -- 0.25 N; Standard Methods for the Examination of Water and Wastewater, 12th Edition.

- COD -- Dichromate Reflux -- 0.025 N, "FWPCA Methods for Chemical Analysis of Water and Wastes," November 1969.

- Color -- Platinum-Cobalt visual, "FWPCA Methods for Chemical Analysis of Water and Wastes," November 1969.

- Solids -- Total suspended solids (non-filterable residue), "FWPCA Methods for Chemical Analysis of Water and Wastes," November 1969, Total volatile suspended solids (filterable residue), "Standard Methods for the Examination of Water and Wastewater," 12th Edition.

- Polychlorinated Biphenyl's (PCB) -- Gas chromatography using the electron capture detect.

Preservation methods for samples sent back to Southeast Water Laboratory:

PCB - None

Solids - None

TOC - 1 ml of 10% H_2SO_4 per 100 ml of sample

COD - Same as TOC.

APPENDIX C

DYE STUDY PROCEDURES

Dye studies were performed June 19-23. Dupont Rhodamine W. T. 20 dye was used for all injections and concentrations were measured by an American Instrument Company Fluorometer. Some samples were collected manually, but the bulk of collection was with Serco automatic samplers -- collecting at 1-hour intervals.

Three in-plant areas were investigated for time of travel:

1. Minimum retention times in the aeration basin and oxidation pond -- 14 gallons of dye were dumped prior to the oxygen injection nozzle at the clarifier outlet. Visual inspection of the dye was first made at the aeration basin inlet pipe. The dye was then visually followed as long as possible through the aeration basin. Samples were collected at the aeration basin and oxidation pond outlets using Serco samplers.
2. Bleach plant waste travel from the sewer line discharge (CC-7) to the spillway (CC-3) -- 1 gallon of dye was dumped and sample collection was made with a Serco sampler.
3. Time of travel from the spillway to Brewton Lake discharge (CC-4) -- three dye dumps were made: 3 gallons at the spillway; 2 gallons at the inlet to Jackson Lake; and 2 gallons at bridge above Merritt Lake. Samples were collected with Serco samplers.

APPENDIX D

Appendix D

Water Quality Data
Container Corporation and Conecuh-Escambia River Basin
(June-July 1971)

Station	Date	pH	Color Pt.Co.	Temp.* °C	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
CC-1	6/20-21	9.5	125	43	104	695	145	168	102	26.7
CC-1	6/21-22	8.3	200	44.5	119	726	190	344	156	26.7
CC-1	6/22-23	9.7	200	44.5	140	658	165	172	108	26.7
CC-1	6/23-24	7.8	240	43.5	107	547	125	232	192	26.7
CC-1	6/24-25	9.4	700	40.5	270	2,671	400	634	298	26.7
CC-1	6/27-28	8.5	600	43	80	1,616	260	316	252	26.7
CC-1	6/28-29	7.3	500	44	103	929	150	176	156	26.7
CC-1	6/29-30	--	400	45	101	675	175	248	212	26.7
CC-1	6/30-7/1	8.0	450	45	125	719	165	240	108	26.7
CC-1	7/1-2	9.1	500	44	162	1,421	275	612	452	26.7
Max.		9.7	700	45	270	2,671	400	684	452	26.7
Min.		7.3	125	40.5	80	547	125	168	102	26.7
Mean		8.6	392	43.7	131	1,066	205	319	204	26.7
CC-2	6/20-21	7.5	120	29.5	11	148	37	60	23	21.7
CC-2	6/21-22	7.9	120	29	11	130	38	25	8	21.7
CC-2	6/22-23	7.8	120	26.5	10	130	37	29	14	21.7
CC-2	6/23-24	8.3	120	28.5	8	125	43	20	10	21.7
CC-2	6/24-25	8.5	200	29.5	13	107	33	10	6	21.7
CC-2	6/27-28	7.4	150	29	10	122	34	18	14	25.0
CC-2	6/28-29	5.4	150	29.5	9	114	37	78	4	25.0
CC-2	6/29-30		200	29	10	147	46	56	4	25.0
CC-2	6/30-7/1	7.5	200	28.5	12	134	44	104	10	25.0
CC-2	7/1-2	7.0	200	27	10	132	49	60	8	25.0
Max.		8.5	200	29.5	13	148	49	104	23	25.0
Min.		5.4	120	26.5	8	107	33	10	4	21.7
Mean		7.4	158	28.6	10.4	129	40	46	10	21.7

* Temperatures are instantaneous.

Appendix D - Continued

Station	Date	pH	Color Pt.Co.	Temp. ^{o}C	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
CC-3	6/20-21	6.0	200	29.5	30	199	62	41	14	51.0
CC-3	6/21-22	6.7	200	32	26	205	69	50	15	51.0
CC-3	6/22-23	6.4	200	28.5	30	203	50	42	17	51.0
CC-3	6/23-24	6.3	240	30.5	30	214	67	44	14	51.0
CC-3	6/24-25	6.3	600	30.5	45	143	60	32	22	51.0
CC-3	6/27-28	6.1	350	31	24	170	54	44	28	54.2
CC-3	6/28-29	6.0	300	31	28	197	58	22	6	54.2
CC-3	6/29-30		300	31.5	28	203	77	28	4	54.2
CC-3	6/30-7/1	6.6	300	31.5	40	227	72	16	4	54.2
CC-3	7/1-2	6.5	300	30.5	33	218	67	68	24	54.2
Max.		6.7	600	32	45	227	77	68	28	54.2
Min.		6.0	200	28.5	24	143	50	16	4	51.0
Mean.		6.3	299	30.6	31.4	198	64	39	15	52.6
CC-4	6/20-21	7.3	200	28	8	152	50	27	10	56.4
CC-4	6/21-22	7.4	200		5	130	48	24	6	56.4
CC-4	6/22-23	7.5	250	19.5	7	60	49	17	11	56.4
CC-4	6/23-24	7.3	250	23.5	9	146	56	16	13	56.4
CC-4	6/24-25	7.4	600	24.5	9	142	48	6	4	56.4
CC-4	6/27-28	7.1	400	26	5	140	48	16	6	56.4
CC-4	6/28-29		350	25.5	5	143	49	14	10	56.4
CC-4			400	26	8	134	57	12	8	56.4
CC-4	6/30-7/1	7.0	300	23.5	10	125	44	16	6	56.4
CC-4	7/1-2	7.0	300		7	143	51	16	14	56.4
Max.		7.5	600	28	10	152	57	27	14	56.4
Min.		7.0	200	19.5	5	60	44	6	4	56.4
Mean		7.2	325	24.5	7.3	132	50	16	9	56.4

Appendix D-Continued

Station	Date	pH	Color Pt.Co.	Temp. ^oC	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
CC-5	6/20-21	9	140	43	94	304	60	50	29	26.7
CC-5	6/21-22	8.7	150	43.5	83	368	90	126	42	26.7
CC-5	6/22-23	9.4	170	43.5	100	386	78	88	56	26.7
CC-5	6/23-24	8.7	200	44	96	297	77	36	32	26.7
CC-5	6/24-25	9.4	600	39.5	124	467	120	88	60	26.7
CC-5	6/27-28	8.7	500	43	62	330	80	84	48	26.7
CC-5	6/28-29	7.1	400	44	90	431	97	92	48	26.7
CC-5	6/29-30		400	44	82	347	99	88	48	26.7
CC-5	6/30-7/1	7.7	400	44	124	365	110	72	40	26.7
CC-5	7/1-2	8.4	450	43.5	130	507	165	160	88	26.7
Max.		9.4	600	44	130	507	165	160	88	26.7
Min.		7.1	140	39.5	62	297	60	36	29	26.7
Mean		8.6	341	43.2	98.5	380	98	88	49	26.7
CC-6	6/21	7.6	120	34	--**	156	45	11	2	25.9
CC-6	6/21-22	7.5	120	33.5	--**	130	50	20	6	25.9
CC-6	6/22-23	7.5	120	33	--**	156	49	65	37	25.9
CC-6	6/23-24	7.4	160	34	28	145	55	44	25	25.9
CC-6	6/24-25	7.3	200	35	31	134	44	24	22	25.9
CC-6	6/27-28	7.2	200	35.5	29	224	69	38	34	25.9
CC-6	6/28-29	6.4	200	36	25	233	66	18	12	25.9
CC-6	6/29-30		200	35.5	19	221	79	8	4	25.9
CC-6	6/30-7/1	7.4	200	35.5	18	204	70	28	14	25.9
CC-6	7/1-7/2	7.0	200	35.5	17	202	73	40	14	25.9
Max.		7.6	200	36	31	233	79	65	37	25.9
Min.		6.4	120	33	17	130	44	8	2	25.9
Mean		7.2	172	35	23.8	180	60	30	17	25.9
CC-7	6/20-21	3.3	500	42	60	412	145	54	42	23.7
CC-7	6/21-22	3.0	500	43	84	435	220	52	42	23.7
CC-7	6/22-23	3.0	500	43.5	80	356	150	24	20	23.7

** Dilutions set too high -- data not valid.

Appendix D-Continued

Station	Date	pH	Color Pt.Co.	Temp. ^{o}C	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
CC-7	6/23-24	2.9	500	43.5	74	374	185	14	10	23.7
CC-7	6/24-25	3.1	500	41.5	77	324	125	32	30	23.7
CC-7	6/27-28	3.8	400	43	34	212	75	10	8	23.7
CC-7	6/28-29	3.4	500	44	58	400	155	8	4	23.7
CC-7	6/29-30		500	44.5	70	370	160	20	2	23.7
CC-7	6/30-7/1	3.4	500	45.5	78	425	180	14	6	23.7
CC-7	7/1-2	3.0	600	44.5	71	385	160	30	20	23.7
Max.		3.8	600	45.5	84	435	220	54	42	23.7
Min.		2.9	400	41.5	34	212	75	8	2	23.7
Mean		3.2	500	43.5	68.6	369	156	26	18	23.7
CC-8	6/20-21	7.0	300	29.5	30	292	52	812	242	3.1
CC-8	6/21-22	7.0	200	27	42	246	61	548	120	3.1
CC-8	6/22-23	7.5	200	29.5	33	192	32	360	104	3.1
CC-8	6/23-24	7.2	260	26.5	39	329	77	504	236	3.1
CC-8	6/24-25	7.3	400	29	43	314	60	772	180	3.1
CC-8	6/27-28	6.5	350	32	24	279	45	704	188	3.1
CC-8	6/28-29	5.7	300	30.5	38	265	50	348	72	3.1
CC-8	6/29-30		300	31	42	459	120	196	176	3.1
CC-8	6/30-7/1	6.4	300	30	38	360	85	648	128	3.1
CC-8	7/1-2	6.5	300	28.5	44	526	110	884	248	3.1
Max.		7.3	400	32	44	526	120	884	248	3.1
Min.		5.7	200	26.5	24	192	32	196	72	3.1
Mean		6.8	291	29.4	37.3	326	69	578	169	3.1

Appendix D - Continued

Station	Date	Time	DO mg/1	pH	Color Pt.Co.	Temp. °C	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
CO-5	6/21	0830	7.3	6.7	10	26	0.6	22.4	5	21	0	
CO-5	6/22	0818	7.2	7.1	10	26.5	0.7	13.2	4	6	1	
CO-5	6/23	0840	7.3	7.1	10	26	0.9	13.2	4	10	2	
CO-5	6/24	0820	7.3	7.1	10	27	0.9	4.0	5	6	1	
CO-5	6/25	0830	7.1	6.9	10	28	1.1	13.7	3	12	8	
CO-5	6/28	0836	7.4	6.7	10	28	0.5	10.4	2	2	1	
CO-5	6/29	0834	7.2	7.2	10	28	0.6	9.7	4	4	2	
CO-5	6/30	0914	7.1		10	28	0.9	9.7	5	8	2	
CO-5	7/1	0820	7.2	7.0	10	28	0.9	12.8	5	5	4	
CO-5	7/2	1020	7.1	6.7	10	27	1.1	13.9	5	8	4	
Max.			7.4	7.2	10	28	1.1	22.4	5	21	8	
Min.			7.1	6.7	10	26	0.5	4.0	2	2	0	
Mean			7.2	6.9	10	27.2	0.8	12.2	4	8	3	
CO-6	6/21	1055	6.9	6.5	10	25	1.0	14.5	7	22	1	
CO-6	6/21	1430	7.2	7.0		27	1.1	18.2	7			
CO-6	6/22	1000	6.9	6.9	10	27	0.7	17.1	7	26	8	
CO-6	6/22	1500	6.9	7.2		28	1.3	17.2	7			
CO-6	6/23	1095	7.0	7.1	10	26.5	0.9	15.8	6	2	1	
CO-6	6/23	1400	7.4	7.2		28	1.3	16.5	5			
CO-6	6/24	1126	6.9	7.0	10	28	0.8	6.2	6	11	2	
CO-6	6/24	1455	7.0	6.9		29	1.1	6.2	6			
CO-6	6/25	1130	7.1	7.0	10	29	1.1	11.9	5	7	2	
CO-6	6/25	1400	7.1	7.1		30	1.0	10.2	10			
CO-6	6/28	1055	6.8	6.7	10	28	0.9	14.9	4	8	2	
CO-6	6/29	1100	6.9		10	29	1.2	11.9	6	4	2	
CO-6	6/30	1130	7.0		10	28	0.9	13.1	7	13	0	
CO-6	7/1	1315	7.2	6.7	10	29	1.3	16.2	6	6	3	
CO-6	7/2	1020	6.9	7.1	10	27	1.1	18.3	7	15	3	
Max.			7.4	7.2	10	20	1.3	18.3	10	26	8	
Min.			6.8	6.5	10	25	0.7	6.2	4	2	0	
Mean			6.9	7.0	10	27.9	1.0	13.9	6	11	2	

Appendix D - Continued

Station	Date	Time	DO mg/1	pH	Color Pt.Co.	Temp. °C	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
LE-7	6/21	1024	8.2	5.4	20	23	0.9	14.7	6	3	0	
LE-7	6/22	0945	8.3	6.1	20	23	0.4	12.8	5	11	3	
LE-7	6/23	1022	8.4	6.2	10	22.5	0.7	13.8	6	14	8	
LE-7	6/24	1100	8.1	5.9	10	23.5	0.4	14.8	5	2	0	
LE-7	6/25	1020	8.1	6.6	10	24	1.1	6.6	4	6	2	
LE-7	6/28	0940	8.5	5.9	10	24	0.8	15.4	2	6	2	
LE-7	6/29	0930	8.5		10	24	0.6	11.8	5	3	2	
LE-7	6/30	1010	8.5		10	23	0.8	14.2	5	7	2	
LE-7	7/1	1200	8.6	7.0	10	25	1.1	12.8	4	3	1	
LE-7	7/2	0921	8.5	7.0	10	24	0.4	13.6	6	6	2	
Max.			8.6	7.0	20	25	1.1	15.4	6	14	8	
Min.			8.1	5.4	10	22.5	0.4	6.4	2	2	0	
Mean			8.4	6.3	12	23.6	0.7	13.0	5	6	2	
BE-8	6/21	1010	6.9	5.6	10	24.5	0.3	12.9	5	12	0	
BE-8	6/22	0930	6.9	6.0	10	25	0.7	13.2	5	8	1	
BE-8	6/23	1005	7.1	6.5	10	24.5	2.7	15.0	5	6	1	
BE-8	6/24	1042	7.1	6.0	10	25.5	1.3	6.7	5	1	0	
BE-8	6/25	0920	6.9	6.2	10	26	1.0	9.0	5	8	6	
BE-8	6/28	0955	7.4	6.1	10	26	0.5	9.9	3	3	1	
BE-8	6/29	0944	6.6		10	26	2.6	15.7	6	3	1	
BE-8	6/30	1025	7.1		10	25	1.4	10.9	5	5	3	
BE-8	7/1	1215	7.5	7.0	10	26	3.0	10.1	4	4	2	
BE-8	7/2	0930	6.7	7.0	10	25	2.7	19.1	11	12	3	
Max.			7.5	7.0	10	26	3.0	19.1	11	12	6	
Min.			6.6	5.6	10	24.5	0.3	6.7	3	1	0	
Mean			7.0	6.3	10	25.4	1.6	12.2	5	6	2	
E-9	6/21	0955	7.1	6.5	10	25.5	0.6	16.1	6	20	2	
E-9	6/21	1400	7.3	7.1		26.5	0.7	14.6	6			

Appendix D - Continued

Station	Date	Time	DO mg/1	pH	Color Pt.Co.	Temp. °C	BOD mg/1	COD mg/1	TOC mg/1	TSS mg/1	TVSS mg/1	Flow cfs
E -9	6/22	0920	6.8	6.8	10	27	4.0	17.32	6	36	3	
E-9	6/22	1430	7.3	7.2		28	2.2	20.0	7			
E-9	6/23	0945	7.1	7.0	10	26	2.4	17.6	6	12	1	
E-9	6/23	1315	7.1	7.1		27	1.7	14.5	5			
E-9	6/24	1025	6.9	6.9	10	27	1.4	10.9	6	10	1	
E-9	6/24	1425	7.1	6.9		29	2.3	9.8	7			
E-9	6/25	0943	7.3	6.8	10	28	1.4	9.6	5	6	3	
E-9	6/25	1325	7.0	6.9		29	2.3	18.0	8			
E-9	6/28	1015	7.1	6.6	10	28	2.5	21.6	5	14	4	
E-9	6/29	1010	7.0		10	29	0.9	13.9	6	4	2	
E-9	6/30	1045	7.0		10	29	0.7	13.6	5	18	5	
E-9	7/1	1230	7.2	6.7	10	29	3.2	19.6	7	5	3	
E-9	7/2	0945	7.1	6.9	10	27	1.6	18.0	7	18	4	
Max.			7.3	7.2	10	29.0	4.0	21.6	8	36	5	
Min.			6.8	6.5	10	25.5	0.6	9.6	5	4	1	
Mean			7.1	6.9	10	27.7	1.9	15.7	6	14	3	
FM-10	6/21	0905	8.5	5.5	10	21.5	0.7	11.8	4	8	1	2.4
FM-10	6/22	0800	8.0	6.5	10	22	0.4	16.4	4	27	1	2.4
FM-10	6/23	0820	8.2	6.0	10	21	0.9	12.2	5	1	0	2.4
FM-10	6/24	0800	8.2	6.1	10	[illegible]	0.7	4.2	5	7	6	2.4
FM-10	6/25	0800	7.4	6.1	10	24.5	1.3	6.2	4	9	6	2.4
FM-10	6/28	0815	8.1	5.9	10	23	.8	5.2	3	4	0	2.4
FM-10	6/29	0810	7.6	6.3	10	23	1.2	14.8	6	12	9	2.4
FM-10	6/30	0850	8.1		10	24	0.3	8.7	4	2	2	2.4
FM-10	7/1	1345	7.6	6.7	10	28	0.9	12.5	5	8	5	2.4
FM-10	7/2	0800	8.0	7.3	10	22	0.6	12.9	5	4	2	2.4
Max.			8.5	7.3	10	28	1.3	16.4	6	27	9	2.4
Min.			7.4	5.5	10	21	0.3	4.2	3	1	0	2.4
Mean			8.0	6.3	10	23	0.8	10.5	4.5	8	3	2.4
Mean lbs/day							10	140	60	107	40	

Appendix D - Continued

Station	Date	Time	DO mg/1	pH	Color Pt.Co.	Temp. ^{o}C	BOD mg/1	COD mg/1	TOCq mg/1	TSS mg/1	TVSS mg/1	Flow cfs
M-11	6/21	0925	8.4	7.1	15	24	1.1	18.1	7	13	0	
M-11	6/22	0930	7.6	7.0	15	24	.3	12.9	6	9	0	
M-11	6/23	0920	7.7	6.9	10	23	1.1	15.0	6	1	1	
M-11	6/24	0915	7.5	7.0	10	24	0.5	5.7	5	4	2	
M-11	6/25	0915	7.3	6.8	10	25	0.6	7.8	4	4	4	
M-11	6/28	0900	7.5	6.3	10	25.5	0.6	10.9	3	5	1	
M-11	6/29	0910	7.7	5.3	10	25.5	0.7	11.6	5	9	4	
M-11	6/30	0835	7.6		10	25	0.5	13.5	6	8	4	
M-11	7/1	1330	7.8	7.1	10	26.5	0.8	18.7	7	7	2	
M-11	7/2	0900	7.7	6.6	10	24	1.3	23.2	9	14	2	
Max.			8.4	7.1	15	26.5	1.3	23.2	9	14	4	
Min.			7.3	5.3	10	23	0.3	5.7	3	1	0	
Mean			7.7	6.7	11	24.6	0.8	13.7	6	7	2	

B. H. Adams

MR. ADAMS: This report contains an evaluation of waste treatment at Container Corporation of America's integrated pulp and paper mill located at Brewton, Alabama. The two-week study, conducted during June-July 1971 by the Environmental Protection Agency, was prompted by 1970 enforcement action. The study was designed to determine the volume of carbonaceous waste generated by increased production, evaluate treatment efficiency, and to qualify any relative changes in water quality in the Conecuh-Escambia River below Container's discharge.

This is the third Federal report containing data relative to carbonaceous waste discharges from Container Corporation's Brewton mill. The first study was conducted during September-October 1969 in response to a request from the Governor of Florida to the Federal Water Pollution Control Administration, Southeast Region, for technical assistance in evaluating interstate and intrastate pollution in Escambia River and Bay. Results of the study were contained in a report entitled "Effect of Pollution on Water Quality, Escambia River and Bay, Florida," and served as Federal evidence of pollution in a January 1970 enforcement conference. The report identified Container Corporation's Brewton mill as the major point source of carbonaceous wastes discharged into the

Conecuh-Escambia River from waste sources in Alabama. Conference recommendation included the removal of 90 percent of the carbonaceous waste generated at the Brewton mill. At a February 1971 reconvened conference, following a detailed study in August 1970 of waste loads before and after treatment, the conferees recommended that Container's daily discharge be limited to 4,850 pounds of 5-day Biochemical Oxygen Demand, hereafter referred to as BOD. This progress report contains the status of survey findings with regard to conference recommendations and compares study results with previous findings.

The cooperation and contribution of Container Corporation's mill management during the study are gratefully appreciated. Particular acknowledgements are due to personnel of the mill's Technical Engineering Section.

Summary:

Container Corporation of America's integrated pulp and paper mill at Brewton, Alabama, has increased average mill production from 900 to 1,050 tons per day. Accompanying this increased production was the addition of a 22-acre basin housing ten 75-horsepower aerators. With the addition of the aeration basin, treatment units in operation at the time of the June 1971 survey included a clarifier, liquid oxygen applicator, oxidation pond, and ponding in six natural lakes.

Time of travel for the 17.2 million gallons per day of unbleached pulp processing waste routed through this complex of treatment units was approximately 4.8 days. Bleachery waste and woodyard drainage amounting to some 17.3 MGD receive treatment through the system of natural lakes only. The success of the pollution abatement program initiated by Container is clearly demonstrated by the following comparison of results from the August 1970 and June 1971 studies:

The average wastewater volume was up from 43 MGD in 1970 to 34.5 MGD in 1971.

The average untreated BOD load of 44,500 lbs/day in 1970 was reduced to 28,200 lbs/day in 1971.

The average BOD discharged to the Conecuh River was 8,500 lbs/day or a population equivalent of 49,900 in 1970. In 1971 this load was down to 2,220 lbs/day or a population equivalent of 13,100.

Reduction of BOD through the treatment system, including the system of natural lakes, increased from 81 percent in 1970 to 92 percent in 1971.

The average untreated total organic carbon load in 1970 was 67,500 lbs/day and 50,500 lbs/day in 1971.

The average TOC discharged to the Conecuh River decreased from 20,800 lbs/day in 1970 to 15,200 lbs/day in 1971.

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Reduction of TOC through treatment facilities, including the system of natural lakes, did not appreciably change. It was 69 percent in 1970 and 70 percent in 1971.

The average untreated chemical oxygen demand was not determined in the 1970 survey. In 1971 it was 205,500 lbs/day.

After reduction of 80 percent, 40,100 lbs/day of COD is discharged into the Conecuh River.

Suspended solids reduction through treatment facilities, including the system of natural lakes, was 81 percent in 1970 and 92 percent in 1971.

Average nonfilterable suspended solids discharged to the Conecuh River in 1970 was 9,800 lbs/day and 4,860 lbs/day in 1971.

Average nonfilterable volatile solids discharged to the Conecuh River were not determined in 1970 but were 2,730 lbs/day in 1971. This represents a treatment reduction of 92 percent.

Average color in discharge to the Conecuh River, this is true color and not apparent color, was 410 platinum cobalt units in 1970. This value was down to 325 Pt-Co units in 1971.

The range of parameters observed in the Conecuh-Escambia River below Container's discharge, that is at Pollard Landing and at Highway 4 Bridge in Century, are as follows:

B. H. Adams

In 1970 the dissolved oxygen ranged from 6.4 to 7.4 mg/l. This parameter ranged from 6.9 to 7.1 mg/l in 1971.

pH values of 6.1 to 7.2 were recorded in 1970 and ranged from 6.9 to 7.0 in 1971.

Temperature varied from 23.5 to 30.0 degrees Centigrade in 1970 and from 27.7 to 27.9 degrees Centigrade in 1971.

In 1970 color ranged from 40 to 60 units, while in 1971 it was unchanged at 10 units.

The following conclusions were drawn from this study:

1. Additional secondary units placed in operation by Container Corporation have resulted in BOD_5 reductions in excess of the 90 percent recommended by the conferees at the February 1971 Escambia River-Bay Enforcement Conference.

2. Through the implementation of additional secondary treatment and improved in-plant controls, Container Corporation has reduced the discharged effluent to less than half the 4,850 pounds per day limit established by conference recommendations.

3. Container Corporation has not complied with the conference recommendation that bleach plant and woodyard wastes be provided secondary treatment.

4. All waste loadings measured at the Brewton Mill were reduced as a result of additional pollution abatement.

5. Woodyard wastes are the largest source of

nonfilterable suspended and volatile solids discharged to the system of natural lakes.

6. Seventy percent of the color in the wastes flowing into the system of natural lakes are the result of bleach plant discharges.

7. Although corrective measures have improved treatment efficiency and drastically reduced waste discharges, additional reductions can be achieved by:

a. Providing additional treatment to bleach plant and woodyard wastes;

b. Eliminating short circuiting in the aeration basin and oxidation pond.

8. Although Container Corporation has not directed treatment toward color reduction, color in the effluent was less intense than that observed in previous surveys and there was a noticeable change in color in the Conecuh River above and below the point of Container's discharge.

9. Except for naturally occurring low pH values in study area tributaries, Murder Creek, Franklin Mill Creek, Little Escambia Creek and Big Escambia Creek, and elevated BOD in Big Escambia Creek, parameters measured indicated that water in the Conecuh-Escambia River tributaries were of relatively good quality.

Mr. Chairman, this concludes the portion of the Federal presentation related to discharges from Container Corporation's paper mill.

MR. WHITE: Thank you, Mr. Adams.

Are there comments or questions?

Mr. Levin.

MR. LEVIN: Mr. Adams, what reason was given to you as to why there was no action being taken concerning these--what did you say, solid wastes? That even though this conference had made certain recommendations and findings that there had been no treatment made of these--I am not sure exactly what particular substance you were speaking of there.

MR. ADAMS: I think what you are talking about is Conclusion No. 3 where I said Container Corporation has not complied with the conference recommendation that bleach plant and woodyard wastes--

MR. LEVIN: That is it.

MR. ADAMS: --be provided secondary treatment.

MR. LEVIN: Why not?

MR. ADAMS: I guess it is a matter of how you define secondary treatment. They consider it secondary treatment. Primary treatment is normally the settling of settleable solids, which will reduce up to 30 or 35 percent of the BOD. The type of treatment that they employ is a biological type of treatment and is capable of removing from 75 to even 95 percent of the BOD. It is ponding, a natural system of natural lakes, and many municipalities use the same system.

MR. LEVIN: Now, as I understand, it is your recommendation that we specify more particularly what we are talking about insofar as these items are concerned?

MR. ADAMS: It needs to be clarified.

MR. LEVIN: And what do you think the effect will be in the event that we clarify this and Container goes even further than the point of the recommendation of the previous conference?

MR. ADAMS: Well, I could not say at this point what further reductions could be expected. As a matter of fact, I think there would have to be some other studies made to determine what this effect would be and we would not want to make specific recommendations at this point as to how this bay should be provided additional treatment.

MR. LEVIN: But you do recommend that that be specified?

MR. ADAMS: It would reduce, I think, the organic load discharged to Conecuh River.

MR. LEVIN: Well, now, let me ask you about Conecuh and Escambia. I am not too familiar with that part of the geography.

MR. ADAMS: Conecuh River ends at the State line and becomes the Escambia River as it flows into Florida.

MR. LEVIN: Will you say that one more time?

MR. MAURIELLO: It changes name.

MR. ADAMS: It changes name. It is the same stream; it changes name.

MR. LEVIN: In other words, it is not two different streams that you are talking about?

MR. ADAMS: No.

MR. LEVIN: The same stream, it just changes name?

MR. ADAMS: That is right.

MR. LEVIN: What about, did you all do any studies on the sewerage problem at East Brewton?

MR. ADAMS: We did not.

MR. LEVIN: Do you know if somebody has done the study?

MR. ADAMS: I would imagine that the State would report on this.

MR. LEVIN: Now, one more thing I just want to get cleared up. Obviously Container Corporation knew that you all were doing the studies?

MR. ADAMS: That is right. We could not have done it without their cooperation.

MR. LEVIN: Now, I am not trying to be paranoid, but I want to find out, is there any possibility that the production could have been reduced at the period of time when you were conducting your surveys?

MR. ADAMS: It is possible, but the production levels were the same as those indicated in their increased production.

MR. LEVIN: Well, now, did you satisfy yourself to the extent that that was being done, that they didn't reduce production just for the purpose of your investigation?

MR. ADAMS: No, sir, we took their word for this and that was the only way that we could determine whether or not they had done this.

MR. LEVIN: Is it feasible to assume that they could have reduced production at the time you were running your test?

MR. ADAMS: I would say it would be difficult over a two-weeks study such as this.

MR. LEVIN: The tests that you all ran in November and December of this year, were they similar to the tests that you ran back prior to the time that we had the previous conference?

MR. ADAMS: In November and December of this year?

MR. LEVIN: Excuse me, 1971. I am sorry.

MR. ADAMS: Yes.

MR. LEVIN: In other words, you all ran studies at the same points, and so forth?

MR. ADAMS: Right.

MR. LEVIN: And that was--

MR. ADAMS: We expanded this study a little bit more than the previous study.

MR. LEVIN: And it was at these points that you noticed the marked reduction in these wastes, and so forth?

MR. ADAMS: Right. It is also reflected in their untreated BOD.

MR. LEVIN: And--

MR. ADAMS: And this would be brought about by in-plant changes.

MR. LEVIN: What other changes are on the drawing board, so to speak, to further reduce the discharge into this river? Are you familiar with that?

MR. ADAMS: Container intends to report on that, I understand, later.

MR. LEVIN: I have no more questions.

MR. WHITE: Mr. Crockett.

MR. CROCKETT: First I want to express the appreciation of Alabama and I am sure of Container for this very comprehensive study and report and the technical assistance which EPA has rendered.

Mr. Levin raised several questions. I think we clarified the point that there is treatment of the bleach plant wastes and woodyard wastes through the natural system of lakes. While I cannot, I note a representative of Container will report to this conference. It is my impression that the monitoring reports routinely submitted to us by Container support the evidence that you obtained in this two-weeks study, but I am sure that there will be an opportunity for more questions of Container's representative later on in the day.

And incidentally, there will be a report on the East Brewton situation.

MR. WHITE: Any other comments or questions?

MR. TRAINA: Billy, do you know--there may be an accompanying report on this; I hope so. I note a significant reduction was made in the amount of BOD generated at the plant. Could you say, relatively speaking, how much of the reduction you noticed at the effluent was due to the in-plant changes as compared to how much was due to the additional treatment that was provided?

MR. ADAMS: No, Paul, I couldn't at this point.

MR. TRAINA: O. K.

MR. WHITE: We can get that from the company.

I want to ask one question.

On the Conclusion 7 in the second part you say, "Eliminating short circuiting in the aeration basin and oxidation pond." What are we talking--I mean you are referring to the 4.8 days flow-through time that they have?

MR. ADAMS: Right.

MR. WHITE: And what do you think it should be or could be or are you prepared to make any statements on that?

MR. ADAMS: I am not prepared. All we are trying to bring out is there could be some kind of in-basin controls taken to increase the detention time in the basin.

It is demonstrated in one of the graphs that is contained in the report. We did a dye study and it showed that the waste as it flowed through the basin was only hitting about four of the aerators in the first cell of the aeration basin.

MR. WHITE: Very good. I guess we can probably get into that a little with the company when they make their presentation.

Mr. Ravan?

MR. RAVAN: Mr. Adams, let's go back to point 3, bleach plant and woodyard wastes. Do you or don't you have a recommendation as to how we should handle that?

MR. ADAMS: We do not, for this reason. We felt that the company had met the requirements of the conferees, excluding this statement, and it was our opinion that if additional treatment should be provided for this waste that it should be worked out between the company and the State water pollution control agency.

Mr. Crockett may like to comment to this.

MR. WHITE: Mr. Crockett?

MR. CROCKETT: Mr. Adams, you, I think, asked a question of how much further reduction, and let's say in BOD or carbonaceous waste, could be attained by further treatment of bleach plant and woodyard wastes. You also asked a question of how much further reduction could be attained by eliminating the short circuiting in the aeration basin that you reported.

I appreciate your position in not being able to put a numerical value. I don't think that I or members of my staff could do it either when this BOD being discharged now is as low as it is, but perhaps we can work that in with the representatives of Container this afternoon.

MR. WHITE: Mr. Levin.

MR. LEVIN: Mr. Adams, you can understand, I am not a technical person in this particular field so maybe I am asking some ridiculous questions, but it is the only way I can arrive in my mind at a solution or attempt to arrive at a solution. And I wasn't a member of the previous conference.

Now, do you feel that Container Corporation is contributing in any significant fashion to the problem that we have in Escambia Bay?

MR. ADAMS: Based on the parameters that we measured during this study I would say no.

MR. LEVIN: So then you are satisfied that the recommendations of the previous conferees are sufficiently strict? That, first of all, it would not be feasible to make them any stricter from a technological standpoint?

MR. ADAMS: Yes, sir, I would agree with that statement.

MR. LEVIN: In other words, now as compared to previously, you are satisfied with the exception of this one area--

MR. ADAMS: With the exception of color, which we have mentioned that their treatment is not directed towards color removal.

MR. LEVIN: I am talking about that Recommendation 3 that you have.

MR. ADAMS: Recommendation 3, yes, sir.

MR. LEVIN: With the exception of that, you are satisfied that everything feasible is being done by Container?

MR. ADAMS: Yes, sir.

MR. LEVIN: And there is no way in the world that they could meet anything any stricter than what has already been put on them, is this what you said?

MR. ADAMS: I wouldn't put it exactly this way, but I think that they have had pretty strict restrictions placed on them at this point.

MR. LEVIN: All right. Now, I think you can see what is going through my mind. You know, the State of Florida has imposed upon Florida industry a complete removal from the bay by January of 1973.

MR. ADAMS: I am aware of that.

MR. LEVIN: All right. And of course in considering the fairness of the situation, where the Florida industries are being required to get out of the bay, why is it not fair that the Alabama industries, for example, likewise be required to do that?

And the only thing I am trying to get straight in my mind, that you are satisfied that they are not contributing in any significant way to the problem that we are having in scambia Bay.

MR. ADAMS: Yes, sir, I would agree with that statement.

MR. LEVIN: With the exception of that one area which you think we ought to straighten out as to what we mean by the removal of those particular wastes?

MR. ADAMS: Right.

MR. WHITE: Any other comments?

MR. CROCKETT: Just this one comment.

MR. WHITE: Mr. Crockett?

MR. CROCKETT: I know we talked up here about short circuiting, but perhaps it may be well to just say that what it is is an aeration basin which is designed to retain the waste for a specific number of days, and what is happening there is that the flow is passing through as a current, so to speak, thereby reducing this time of retention to what you have reported here.

MR. ADAMS: That is channelized through the basin, I believe.

MR. CROCKETT: That is correct. Now, there would be perhaps some rearrangement of aerators, if that is possible, or baffling might be the answer there.

Thank you.

MR. WHITE: Do you know, Mr. Crockett, whether or not the company plans to address this particular problem? Have they done anything toward any design of baffles?

MR. CROCKETT: They will report on that this afternoon.

MR. WHITE: O. K. Fine.

Mr. Traina?

Excuse me.

MR. TRAINA: I have a few comments.

MR. WHITE: Mr. Levin has another question.

MR. LEVIN: Mr. Adams, what you are saying is that at the particular points of the Escambia River that you checked, that they compare with the same general areas that you checked in the other rivers coming into the State of Florida? Is this basically what you are saying?

MR. ADAMS: You are talking about the presentation that Mr. Little made a few minutes ago.

MR. LEVIN: You all made a comparison between what is coming down the Escambia River as compared to what is coming down the Choctawhatchee.

MR. ADAMS: This was based on three samples taken by your agency whereby the analyses were performed by EPA, yes. I believe Mr. Little said that the only difference was that color and TOC values were slightly higher below Container's discharge.

MR. LEVIN: And do you find any appreciable change further downstream, so to speak, just before it enters the Monsanto area place of discharge?

MR. TRAINA: Dave, could I suggest that Mr. Little get back up in response to that, since he made the report on this part of the study?

MR. LEVIN: Yes.

MR. LITTLE: The answer to that question is yes, there was further reduction downstream from the key station at Century, Florida, in both TOC and color values. I will check that to be sure, but I think that is an accurate statement.

MR. LEVIN: I am not concerned so much with whether or not there were reductions other than the fact as to how it compared with the other rivers at about the same point.

MR. LITTLE: At the same point I think that we are back to what we would consider normal background levels in all streams at the station upstream from Monsanto.

MR. LEVIN: Are you saying even with respect to color and TOC's?

MR. LITTLE: Without some checking on that in detail, if you will let me take just a moment, I will be sure of that.

I think the statement is correct if I said that these levels of TOC and color were comparable in all the rivers studied at the station just above Monsanto compared to these other streams.

MR. LEVIN: How about, were any studies made of the bottoms of these rivers?

MR. LITTLE: No, sir. These were strictly water samples taken at mid-depth in these streams.

MR. LEVIN: Do you have any idea as to what the discharge of Container is doing to the riverbed itself? In other words, is there any residue being left on the bottom as it goes?

MR. LITTLE: In these particular studies we did not address that point. There have been previous studies which led into the first conference and I don't recall those results without reference to the report. Mr. Traina--

MR. TRAINA: I could speak to that. The first conference--

MR. LEVIN: Let me get one more thing. The thing I am trying to find out, is there any possibility that the problem we are having on the bed of Escambia Bay could in any way be contributed by any discharge coming out of Alabama? This is what I am trying to find out.

MR. TRAINA: Of course the possibility always exists. However, the data that was reported to the first session of the conference, the Federal report went into the question of biota in Escambia River and generally concluded that although there were some changes in the mix of biota that it still represented a healthy pollution condition--excuse me (laughter)--a healthy quality condition,although there were some changes in biota observed below Container, but it still was a healthy condition. This was reported in the first session of the conference.

MR. LEVIN: So in layman's language, what you all are saying is that Container is not contributing to our problem? Is this what you are saying?

MR. TRAINA: I think the data that has been presented in all these three sessions bear that out, with the exception of the color problem. We don't want to avoid the color business, which we have always picked up as a problem, the color.

MR. RAVAN: I have a further question.

Again just for clarity, Mr. Little, in previous studies to this study has there in fact been a sedimentologist available, EPA or otherwise, that has conducted sediment studies in the Escambia River and in the bay and compared the two?

MR. LITTLE: Studies of the sediment character were made in 1969, I believe, Mr. Ravan, and how far up the river they went with this particular study I am not aware. We do have copies of these reports with us that we could check. I think it was principally confined to the bay area itself.

Now, from a sedimentology research standpoint, where we are talking about the age of sediments and the quality would vary as it varies with depth, the rate of deposition of sediments, no studies of this type have been performed under our direction.

MR. RAVAN: Mr. Traina, could you address that?

MR. TRAINA: Just what Alec says. We did in the 1969 study do sediment work in which we just characterized the nutrient levels in sediments, but this was confined primarily to the bay. I think we went up just a little bit into the river, but we didn't do anything at the State line.

The only work we have done in this regard is the biological work that I earlier referred to.

MR. LEVIN: Could I ask one question?

MR. WHITE: Surely.

MR. LEVIN: Paul, the only thing I am trying to find out is whether or not there is a possibility or probability that a discharge from Container Corporation might possibly be coming down the river, that while it may not have a chance to settle into the river because of the flow of the stream it might make its way into the bay and thus settle to the bottom when that flow is no longer present to keep the thing moving. This is what I am trying to find out. And of course the engineers and the biologists and the chemists are going to have to tell me that, because that is going to depend, I think, on how much of the BOD's and the TOC's and a few other letters that you all find out there.

MR. TRAINA: To answer that question, I think that is an easy one, Dave. The settleable materials have been taken out in treatment so there are no settleable materials to speak of. Of course you always have a little bit--

MR. LEVIN: What is the effect of that thing that they are not removing, that we don't remove?

MR. TRAINA: This is color and possibly TOC.

MR. LEVIN: Tell me what TOC is.

MR. TRAINA: TOC is total organic carbon. Maybe we ought to get into this.

When we did this earlier, the recommendations of the first conference related to TOC in that we felt that this was a paramater that needed to be controlled so we can control eutrophication of the bay.

MR. LEVIN: Why?

MR. TRAINA: Because carbon is an essential parameter in the life cycle of algae and the whole process whereby bays and other bodies of water become eutrophied. So we put some limits on TOC throughout the area and this is why the TOC question has come up.

MR. LEVIN: The thing that doesn't seem consistent to me is that if they found all these great things along about Century, you know, that nothing is happening, and so on and so forth, why they were told to do that if in fact it is not going to help anything along about the Century mark. Do you understand what I am saying?

MR. TRAINA: Well, the question of the bleachery wastes is related not only to TOC but the color problem. As you noticed, the report that Mr. Adams made said that 70 percent of the color is in the bleachery wastes and this has always been a problem.

MR. LEVIN: So in other words, if we go ahead and push that point you think the TOC's and the color might improve?

MR. TRAINA: There are some indications, we have checked this with our research people, that color and TOC are somewhat related, that if we could get at the color problem we could further reduce the TOC. However, all the evidence is not in on that one.

MR. LEVIN: O. K.

MR. TRAINA: But this is why we continuously made that recommendation on bleachery wastes.

MR. WHITE: Mr. Crockett?

MR. CROCKETT: At the risk of running this into the ground I will make this one comment. It may not be made; I don't know whether Container proposes to make it or not.

But it has been reported by us at previous sessions of this conference that Container, in addition to monitoring its wastes and the river for such things as were included in the EPA study, that they have a highly trained professional biologist make an annual biological study of the river and it extends down into Florida, and I don't think that those reports have ever indicated that there is any biological damage; in other words, as the river moved into Florida that the stream had recovered to a normal state of affairs so far as the biota would be concerned.

MR. WHITE: Well, I will make one observation, and Mr. Little, you and Mr. Adams correct me if I am wrong.

It is my understanding that the primary problem we are having in the bay now we associate with the nitrogen and the phosphorus discharge. Is this correct? Or am I jumping ahead?

MR. LITTLE: You may be jumping ahead a little bit. I think that carbon is associated with it, but all three of these are getting into a realm of relationship that is--

MR. WHITE: I understand that this discussion about the role that carbon plays hasn't been settled, but is it not correct to state that one of the prime concerns of the initial report was to reduce the nitrogen and the phosphorus load?

MR. LITTLE: Very much so, yes.

MR. WHITE: And I don't believe that we have any discharge or significant discharge of these two parameters, do we, from the Container Corporation?

MR. LITTLE: From the Container Corporation, no. We have not included these particular analyses in the study of 1970 or 1971, but the earlier studies, the first ones that were made, I believe, discovered that these particular items, nitrogen and phosphorus, were not significant from the standpoint of their waste discharge.

And I think perhaps, Mr. Chairman, this was the reason that there may have been some modification of the recommendations at the last conference based on nitrogen and phosphorus from their plant. As you read a moment ago, these are not considerations at this moment. We are more concerned with the BOD and the color and TOC removal.

MR. RAVAN: Mr. Chairman, if you will.

Joe, I might like to run this into the ground a little bit. (Laughter.) If we could do that maybe we could get it out of the water.

MR. LEVIN: I will drink to that. (Laughter.)

MR. RAVAN: Mr. Little, I wish you would give me a recommendation as to whether or not you think we should conduct a long-term look or a short-term look at the sediments in the bay and in the river.

MR. LITTLE: I would like to address this later on today. This actually won't conclude our Federal presentation at this moment when Mr. Adams and I finish this morning. And sedimentology studies were a part of this later presentation.

MR. RAVAN: Good. That is what I want. Thank you.

MR. MAURIELLO: John, I have got one.

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: Alec, straighten out one point for me; maybe Billy better.

There has been a reduction in raw BOD that has been generated, which I think that the report indicates. What reasoning do you give that the TOC hasn't been reduced by the same amount? Is there any reasoning that you have used that the discharge of TOC from Container is still about the same level, it is about 25 percent reduction, roughly, even though raw BOD has been reduced--

MR. ADAMS: In the discharge you are talking about?

MR. MAURIELLO: In the discharge.

MR. ADAMS: I think that your TOC is coming back in your natural ponding system.

MR. WHITE: Speak into the mike.

MR. ADAMS: I think that the TOC concentration bodies are coming back in the natural ponding system. We found very little reduction in TOC through the natural system. There was a good relationship between BOD and TOC reductions through the aeration basin and lagoon system.

MR. MAURIELLO: The point being, then, that the load of TOC--and I certainly don't want to open up that can of worms too much, but I think that we have got to recognize, as Alec said, that there is a relationship in the bay between phosphorus, nitrogen and carbon--but the load of TOC is still there, it has been reduced by about 25 percent, but it is still up in the range of 15,000 pounds a day. Is this a correct statement?

MR. ADAMS: This is correct. And if you would refer to a graph in the text report, I think you will see that most of the TOC is generated from the bleachery plant discharge.

MR. MAURIELLO: O. K.

MR. LEVIN: Which means that if we do something about that bleach business that you have suggested that that is going to further reduce the TOC, is this right?

MR. ADAMS: Correct.

MR. TRAINA: That is right.

MR. WHITE: Any other comments or questions?

If not, thank you very much, Mr. Little and Mr. Adams.

Mr. Traina.

MR. TRAINA: The next Federal speaker is Dr.--I want to get his exact title--Dr. Tom Duke, who is Laboratory Director of EPA's Gulf Breeze Laboratory right here at Gulf Breeze.

Dr. Duke.

DR. THOMAS W. DUKE, DIRECTOR
SABINE ISLAND LABORATORY
ENVIRONMENTAL PROTECTION AGENCY
GULF BREEZE, FLORIDA

DR. DUKE: Mr. Chairman, conferees, ladies and gentlemen.

Dr. T. W. Duke

I have prepared a statement from our laboratory and have made an abstract of it for presentation, and I request that the entire statement be entered into the record.

MR. WHITE: It will be accepted in the record as if read.

(The above-mentioned statement follows:)

APPENDIX

Statement of Dr. Thomas W. Duke, Director
Gulf Breeze Laboratory, Environmental Protection Agency

REPORT OF MENHADEN CONFERENCE

A conference on menhaden fisheries was convened at the Gulf Breeze Laboratory on April 7, 1971, as recommended by Conferees of the Enforcement Conference held in Pensacola, Florida, on February 23-24, 1971. The purposes of this conference were (a) to discuss the migration of juvenile menhaden into restricted bayous in Escambia Bay and contiguous waters and (b) to recommend methods to limit this migration. The agenda for the conference and a roster of attendees and the organizations represented are attached as Exhibits 1 and 2.

Conference Discussion

Scheduled speakers presented enlightening information on the biology of the menhaden, movement of these fish in our area, catch data in associated species of fish and facts about the use of air-curtains in the bay last year. The discussion can be separated into five general topics: (1) biology and value of Gulf menhaden; (2) cause of fish-kills; (3) use of air-curtains to control movement of menhaden; (4) need for an effective clean-up crew, and (5) introduction of predator species to control populations of menhaden.

1. Biology and value of Gulf menhaden:--This report is partly based on a study by the National Marine Fisheries Service Laboratory, Beaufort, N. C., on that portion of the life history of Gulf menhaden that occurs in inside waters at Pensacola. Collections were obtained during 1970 and 1971 from the Pensacola Bay bridge and from upper East Bay and lower East Bay River.

Larval menhaden hatch in the Gulf of Mexico and after 3 to 5 weeks enter estuaries for further development. Spawning takes place near shore from late October through March. Larvae enter the Pensacola inlet during a 5-month period, December to April, and range in size from 10 to 30 mm (1/2 to 1") total length. They are elongated, transparent, and without scales. They school by size from the time they enter the estuary. Larvae were most abundant in February -- 5 or 6 per cubic meter of water strained. Therefore, juveniles comprising the summer fish-kills are first found in Escambia Bay as small larvae from December to May.

Early growth in the East Bay area was in low salinities or fresh water. As the young increased in size, they moved downstream to the lower bay where salinities were over 10 parts per thousand or about 1/3 as salt as seawater. Juveniles 30 to 50 mm (1 to 2") in April attained a size of 90 to 120 mm (3 1/2 to 4 3/4") by August. Also abundant in August were much smaller fish from late season spawning. The small size of all catches after August indicated that most juveniles had moved toward the Gulf. Schools of yearlings hatched the previous spawning-season also appeared in the estuary from April to October. These were 90 to 130 mm (3 1/2 to 5") long in April and over 150 mm (6") long in October. They probably enter the estuary from the Gulf to feed.

Menhaden, like mullet, are filter feeders on algae and the remains of higher plants. Also, they are near the bottom of the food chain and provide food for many carnivores. Some fish common to Escambia Bay that prey on menhaden are the silver perch, seatrout, croaker, sea catfish, ladyfish, lizardfish, and flounder.

Since 1963, the menhaden has been the most valuable fish in the Gulf. It is strictly an industrial fish and not used for human food. Products are fish meal for poultry and hogs, oil for lubricants, paints, and soaps, and condensed solubles for protein supplement to animal feed. Gulf menhaden catches set a new record in 1971, exceeding the historic record catches of Pacific sardine in 1936 and Atlantic menhaden in 1956. Over 1 1/2 billion pounds were landed at 13 processing plants in only three states: Louisiana, Mississippi, and Texas. Half were fish 1 to 2 years old and half were 2 to 3 years old. Eighty-five purse-seine carrier vessels operated, each capable of carrying up to 350 tons of menhaden. It has been estimated that for each 1 billion pounds in the commercial catch, 50 billion juveniles must grow up in Gulf estuaries.

2. Cause of fish-kills:--Participants in the conference reiterated that excess nutrients in the water of Escambia Bay cause a eutrophic situation which results in low dissolved oxygen in the water. When large populations of fish enter restricted areas with low amounts of oxygen, a fish-kill can be expected. Participants emphasized the need

for expediting the removal of excessive nutrients from waste streams that enter the bay and pointed out that any temporary control of fish-kills should not in any way slow down this removal.

3. Use of air-curtains:--Observations on the use of air-curtains last year in Mulatto Bayou indicate that air-curtains can keep the juvenile menhaden out of restricted areas. However, some problems are involved.

(a) Ecological effect: The effect of the air-curtain on the movement of crabs, shrimp, and fishes other than menhaden is not known. By restricting the movement of these animals, the curtain might adversely affect the nursery grounds we are striving to protect.

(b) Cost: DOT, Marine Patrol, and Florida A&WPC submitted actual cost figures for an operation of three compressors (which are rated for 5000 hours) used in the summer of 1970. The monthly cost for continuous operation was about $10,000.

(c) Vandalism: A battery was stolen and possibly also air filters, etc.

(d) Down-time: When the compressor was shut down for even a short period of time for maintenance, schools of menhaden on the bay side of the curtain swam into the bayou where they were entrapped. Trawling in the bayou resulted in the accidental removal of air-curtain pipes.

(e) Maintenance: Compressors used last year required constant observation. Sealed compressors (more expensive) or blower-type compressors (require electrical power) should be purchased and used. A standby compressor is necessary to ensure continuous operation. Electricity, of course, is not always available where the compressors are needed.

(f) Noise pollution: Residents complained of noise from compressors.

(g) Property settlement: Arrangement must be made with property owners to place compressors on their land. This probably will require a rental fee.

(h) Number of air-curtains required: At least 10 air-curtains would have to be employed in the bay systems to limit entry of menhaden into all bayous with low oxygen.

4. Control by use of predators:--Biological control of the menhaden would be a useful tool for holding down population numbers. Striped bass was discussed as a possible predator. Discussion indicated that it would be feasible to introduce the bass into Escambia Bay, but the effectiveness of the bass as predators of menhaden is unknown. More important is the possibility that Aroclor 1254, which now occurs in the bay, will accumulate in the edible tissues of this predator and be transferred to man. For this reason, the subject was dropped.

5. Need for effective clean-up crew:--No matter what temporary measures are employed to control the movement of menhaden, a crew will be needed to remove dead fish that result from fish-kills. Suggestions were made to employ 12 migrant laborers or high school or college students to work with a State agency, such as DOT, and can be on call to respond quickly for clean-up work when fish kills occur. Equipment required would include two boats rigged for clean-up purposes ($2,500 each), three trucks with driver ($80/day each when in use), and a loader plus driver ($80/day when in use). The fish would be disposed of initially in the county sanitary landfill. The possibility of using the fish as fertilizer in pine-tree nursery areas should be explored also.

Recommendations

(1) Removal of nutrients and other pollutants from waste streams entering Escambia Bay should be continued and expedited.

(2) Air-curtains should be installed only in Mulatto Bayou to further evaluate their effectiveness as a barrier to the passage of menhaden and to investigate the effects of the air-curtains on the ecology of the bayou and nearby waters. In particular, the relation of the air-curtain to the normal passage of shrimp, crabs, and fishes other than menhaden should be determined. Useful information should be obtained within a year. Placement of other air-curtains in Escambia Bay and contiguous waters will depend upon evaluation of these data. This study could be funded as a demonstration grant or through some other State and Federal grant programs.

(3) A work-force should be created to respond quickly to remove dead fish from "fish-kills". The work-force could consist of high school or college students or migrant laborers who would work on State and Federal Highway projects but would be free to respond to a fish-kill quickly. Initially, the conference recommends a work crew of 12, with access to: two estuarine boats, equipped for "skimming" or seining dead fish, three trucks with drivers, and one loader with driver. This clean-up crew will be required even if air-curtains are used. The evaluation project on Mulatto Bayou could include studies of development of specific clean-up equipment and efficient organization of the emergency work-force for estuarine fish-kills. This project also could investigate the feasibility of using dead menhaden as fertilizer on plots of sand-hill vegetation used to raise pine trees.

(4) Controlled and limited dredging in the inlet to Woodland and Hoffman Bayous to remove obstructions and permit free circulation of water between the bayou and contiguous waters.

EXHIBIT 1

ENVIRONMENTAL PROTECTION AGENCY
GULF BREEZE LABORATORY
SABINE ISLAND
GULF BREEZE, FLORIDA 32561

7 April 1971

CONFERENCE ON MENHADEN

AGENDA

A. M.

9:30	Introduction	Dr. Thomas W. Duke Environmental Protection Agency
9:40	The Importance of Estuaries to the Early Life History of Gulf Menhaden	Dr. Paul L. Fore National Marine Fisheries Service
10:00	Notes on the Biology of Young Menhaden in a Pensacola Estuary	Mr. Marlin E. Tagatz National Marine Fisheries Service
10:20	Life History of Menhaden Relative to Mulatto Bayou	Dr. Thomas S. Hopkins University of West Florida
10:40	Coffee Break	
11:00	Operation of Air Curtain	Mr. Lee Tebo Environmental Protection Agency
11:20	Operation of Air Curtain in Mulatto Bay	Lt. Lewis E. Zangas Florida Department of Natural Resources and A Representative of Florida Department of Transportation
12:00	Lunch	
1:30	Discussion and Recommendations	Conference
5:00	Adjournment	

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EXHIBIT 2

MENHADEN CONFERENCE -- ATTENDEES

Name	Organization
Dr. Thomas W. Duke, Chairman	Environmental Protection Agency Gulf Breeze, Florida
Mr. David J. Hansen	"
Dr. Paul L. Fore	National Marine Fisheries Service Gulf Breeze, Florida
Mr. Marlin E. Tagatz	"
Dr. Thomas S. Hopkins	University of West Florida Pensacola, Florida
Mr. Michael Schmitt	" (Graduate student)
Dr. Robert L. Livingston	Florida State University Tallahassee, Florida
Lt. Lewis E. Zangas	Florida Marine Patrol Pensacola, Florida
Sgt. John L. LaLander	"
Mr. James G. Mills, Jr.	Florida Department of Natural Resources Bureau of Marine Science & Technology Apalachicola, Florida
Mr. J. M. Barkuloo	Bureau of Sport Fisheries & Wildlife Panama City Beach, Florida
Mr. P. J. Doherty	Florida Department of Air & Water Pollution Control, Gulf Breeze, Florida
Mr. W. T. Young	"
Mr. L. R. Smith	Florida Department of Transportation Tallahassee, Florida
Mr. Willard Norris	"
Mr. Charles J. Allen	"
Mr. Lee Tebo	Environmental Protection Agency Athens, Georgia

OYSTER MORTALITIES IN ESCAMBIA BAY

The Gulf Breeze Laboratory was asked to investigate causes of severe oyster losses that reportedly occurred in Escambia Bay from September 2 through September 6, 1971. Pathologist John Couch and biologist Patrick Borthwick, using the vessel Dolphin, investigated oyster beds on the east side (Pearson's lease) and west side (Devil Point) of Escambia Bay on September 8.

Meterological and Hydrographic Data

Site I: Pearson's oyster lease (east side of bay)
Weather: Clear to partly cloudy, warm. Brisk surface winds mixing surface water well.
Water depth: 5 to 8 feet.
Salinity: Top, 21‰; Bottom, 22‰.
Water temperature: Bottom, 27.5° C (8 feet); 28.5° C (5 feet).
pH: Bottom 7.7.

Site II: Middle of Escambia Bay between Pearson's lease and Devil Point.
Water Depth: 25 feet.
Salinity: Bottom, 22‰.
Water temperature: Bottom, 27.5° C.
pH: Bottom 7.5.

Site III: Devil Point Buoy (west side of bay)
Water Depth: 8 feet.
Salinity: Top, 14.5‰; Bottom, 20‰.

Water temperature: Bottom 27.5° C.

pH: Bottom, 7.7

Mortality Observations

Three dredge hauls were made on Pearson's lease: two on the inshore side; one on the offshore side. Boxes, gapers, and closed live oysters were counted in each dredge haul and mortality expressed as the percentage of fresh boxes. Based on the relative abundance of fresh boxes and lack of gapers, it appeared that the major mortality had reached its peak at least two days prior to our examination. On Pearson's lease, mortality appeared to fall between 67.8% and 94.5%. Two dredge hauls from Devil Point buoy suggested a mortality of 40-50% for the western shore up to that time. Only four gapers were obtained in all the dredge hauls. Nineteen live oysters (survivors) from the eastern shore, and 10 from the western shore were taken along with the gapers for laboratory analyses. Five oysters, reportedly taken from "Long Creek" - an area of low mortality" - were also included in the analysis.

Laboratory Observations

Methods:--The oyster pathogen, Dermocystidium marinum, was searched for in shells and meats of each oyster examined. Pieces of gill, heart, and rectum were placed in fluid thioglycollate medium fortified with 500-1000 units/mℓ of penicillin and streptomycin and incubated at room temperature. Samples of those tissues were stained with Lugol's iodine and examined at 36, 60, 72, and 96 hours, and at six days.

Nineteen live oysters and one gaper were processed for histology (7-micron sections; Mayer's hematoxylin). Remaining portions of oysters were given to State investigators for further analysis of heavy metals, etc. One group of oysters, three water samples, and two mud samples were analyzed for PCB and pesticides.

Results

Prevalence of Dermocystidium

Infection	Culture (FTM)				Histological			
	*H	M	L	Neg	H	M	L	Neg
Gapers	4				1**			
Survivors	8	1	16	9		2	8	9
Total				38	** only 1 gaper; 20 processed			

Prevalence based on culture only:--76.3% overall prevalence (survivors + gapers); 100% prevalence in gapers.

*H - Heavy; M - Medium; L - Light.

Histological examination indicated that in the gaper, there was heavy systemic infection of Dermocystidium marinum. All organs were invaded and there were abundant multiple-fission stages as well as hypnospores. Only in certain foci of the gaper was there still evidence of an active host response (i.e., infiltration by leucocytes). Most regions showed lysis and necrosis of the tissues.

In the lighter infected survivors, there was evidence of emanciation. Certain of these oysters contained abcesses associated with *D. marinum* stages. Encapsulations of hypnospores and multiple-fission stages were found. Certain of these oysters appeared to be in possible late stages of remission of *D. marinum* disease. The 9 uninfected oysters were ripe males and females and generally less emaciated. These oysters had not spawned and contrast with several of the infected oysters which had spawned and were emaciated.

Tentative Conclusions

Unfortunately, relatively few dying oysters (gapers) were collected and observations and collections were at least 2 days late. However, based on culture and histological diagnosis, it appears that *Dermocystidium marinum* was a large contributing factor to the mass mortality of these oysters. The time (late summer), water temperature (up to 33° C prior to kill, according to W. T. Young, State Biologist) and salinity (22 - 23‰) were optimum for a *Dermocystidium* epizootic.

Since the oyster kill reportedly occurred rapidly, other factors such as pollutants, fresh water influx, algal blooms and possible overcrowding could have been involved as contributing stresses on infected oysters.

SURVEY FOR POLYCHLORINATED BIPHENYLS

We continued to monitor the water, sediment, and biota of Escambia Bay and contiguous waters for Aroclor® 1254. As reported in the 1970 Escambia Bay Enforcement Conference Proceedings, we traced one source of this polychlorinated biphenyl to an accidental

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® Registered trade mark - Monsanto Company leak at the Monsanto Chemical Plant located on the Escambia River. Aroclor 1254 entered Escambia River at the Monsanto Weir, was carried downstream and is now in biota, sediment, and water of Escambia Bay and contiguous waters. The source of the leak was eliminated when Monsanto was notified of the problem in August 1969. A survey conducted by this laboratory in December 1970 and reported in the 1971 Escambia Bay Enforcement Conference Proceedings showed that residues of this chemical continued to occur in the biota, sediment and water of the estuarine system. Another survey was conducted on October 26, 1971 to determine existing levels of Aroclor 1254 in the bay. In the recent survey, we analyzed samples of:

(1) Water collected at six transects that were located upstream from the Monsanto Chemical Company on the Escambia River and extended downstream to upper Escambia Bay (Figure 1),

(2) Sediments collected with a grab sampler from the river and estuary at 10 transects established from the previous study (Figure 2),

(3) Sediment cores from eight stations in the lower river and upper bay (Figure 3), and

(4) Biota, including vegetation, invertebrates and vertebrates from different locations in the estuary (Figure 4).

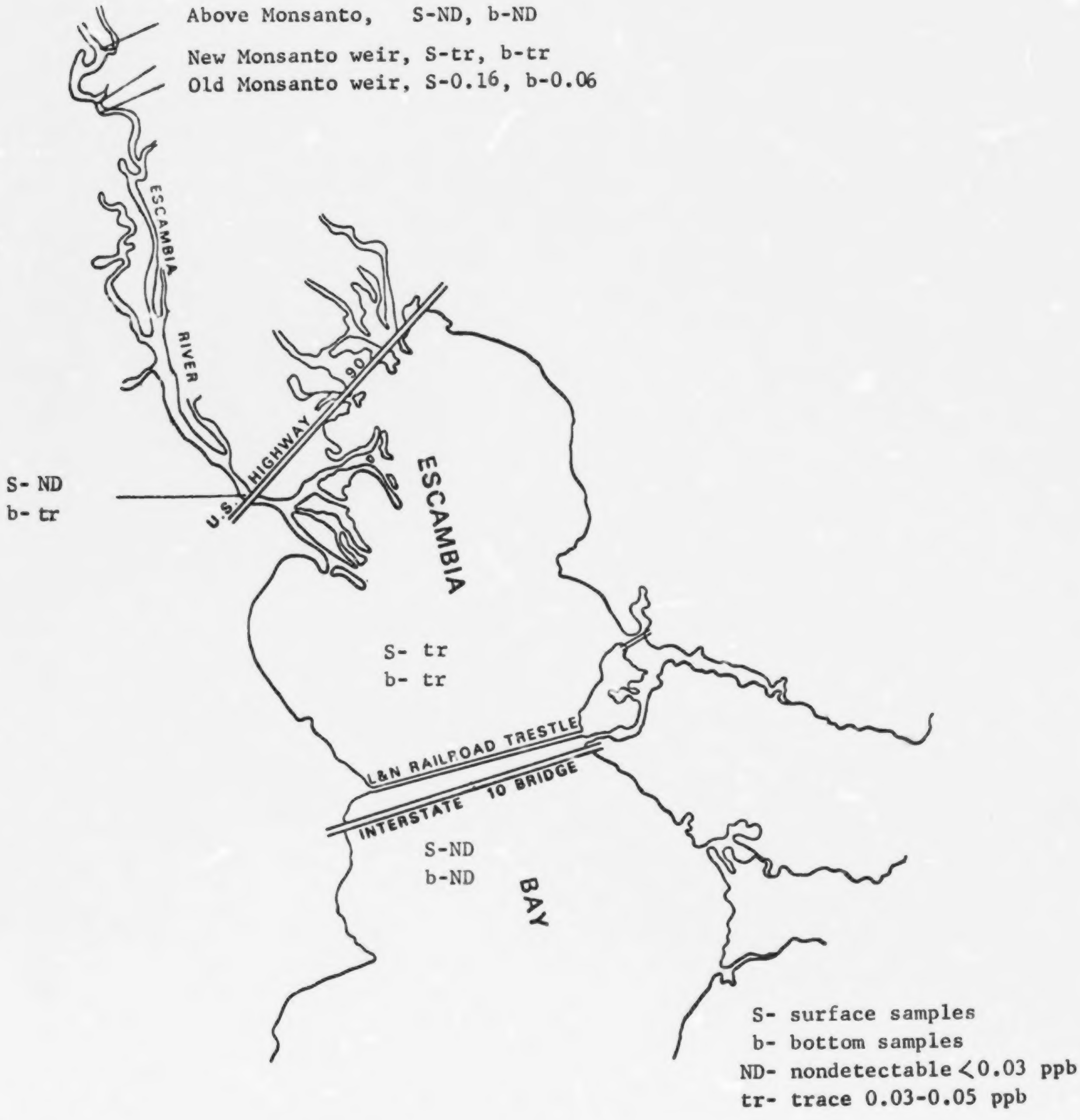
Results:--The concentrations of Aroclor in the water were approximately the same or lower than those recorded in the 1970 survey. Concentrations were lower in water collected near the old Monsanto outfall (weir) and in surface water above the Highway 90 bridge.

Greatest amounts of Aroclor were found in sediments collected near Monsanto in upper Escambia Bay but concentrations in sediments at most locations were less than those reported in 1971. The greatest decrease was found in sediment cores, especially in the core from sediment collected above the L&N bridge (Figure 3, stations E and F). Sediment cores from the estuary showed that the upper strata at this time were the most contaminated.

As much as 10 times more Aroclor occurred in samples of biota from Escambia Bay than occurred in those taken from East Bay (Table 1 and Figure 4). Benthic species collected from upper bays (Table 2) appeared to contain more Aroclor than those from other locations in the system.

Conclusions:--The concentrations of Aroclor 1254 at many locations in the river and the estuary appear to have decreased in magnitude since the survey one year ago, although no statistical evaluation was made due to the limited number of samples taken. Without doubt, Aroclor 1254 is dispersed in this estuarine system as indicated by the residues in the biota collected from the various parts of the system and the chemical appears to be concentrated in the higher trophic levels.

Figure 1. Concentrations (expressed in parts per billion) of Aroclor® 1254 in water samples collected Oct. 26, 1971, from Pensacola Estuary.



Above Monsanto, S-ND, b-ND

New Monsanto weir, S-tr, b-tr

Old Monsanto weir, S-0.16, b-0.06

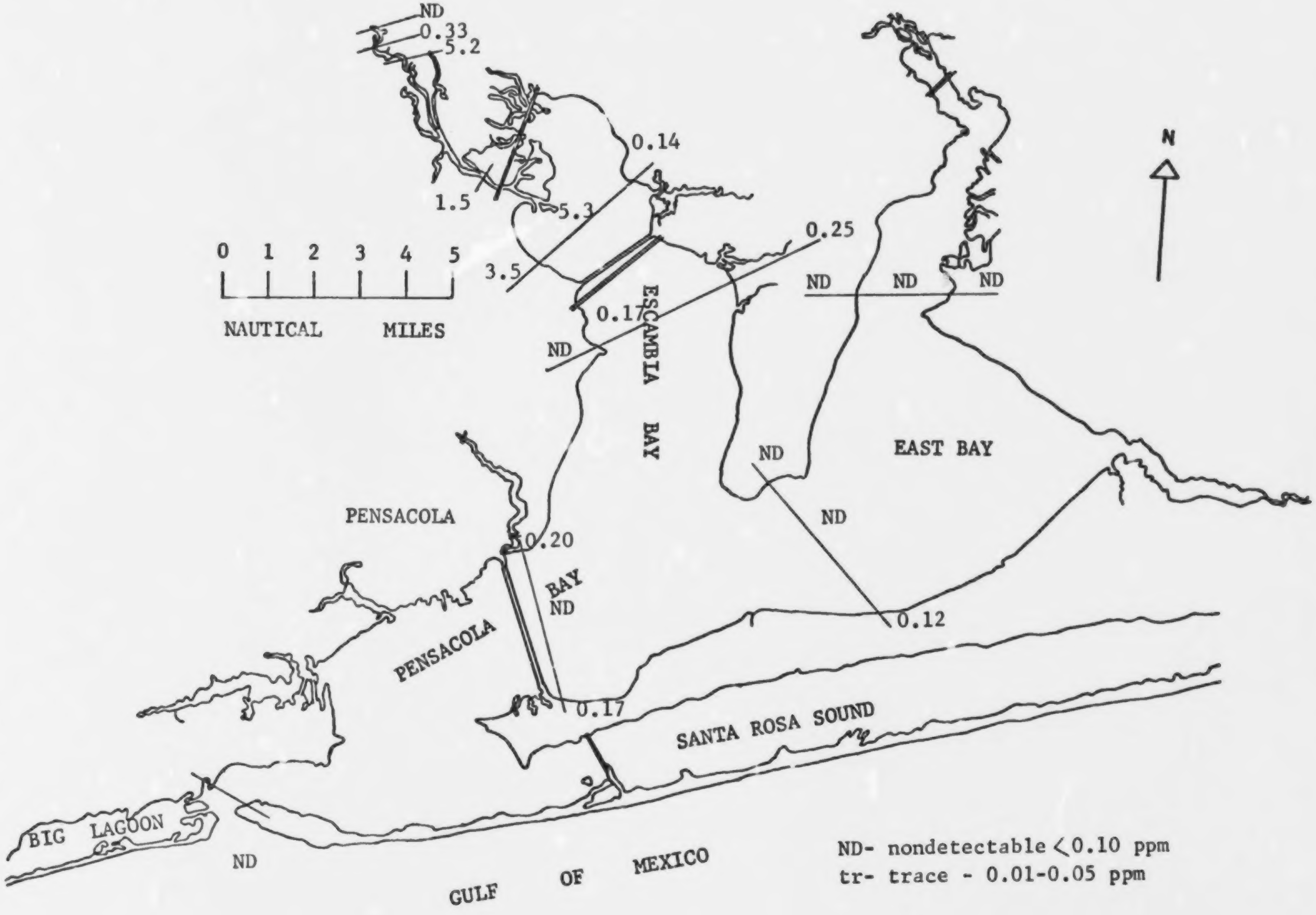
S- ND
b- tr

S- tr
b- tr

S-ND
b-ND

S- surface samples
b- bottom samples
ND- nondetectable <0.03 ppb
tr- trace 0.03-0.05 ppb

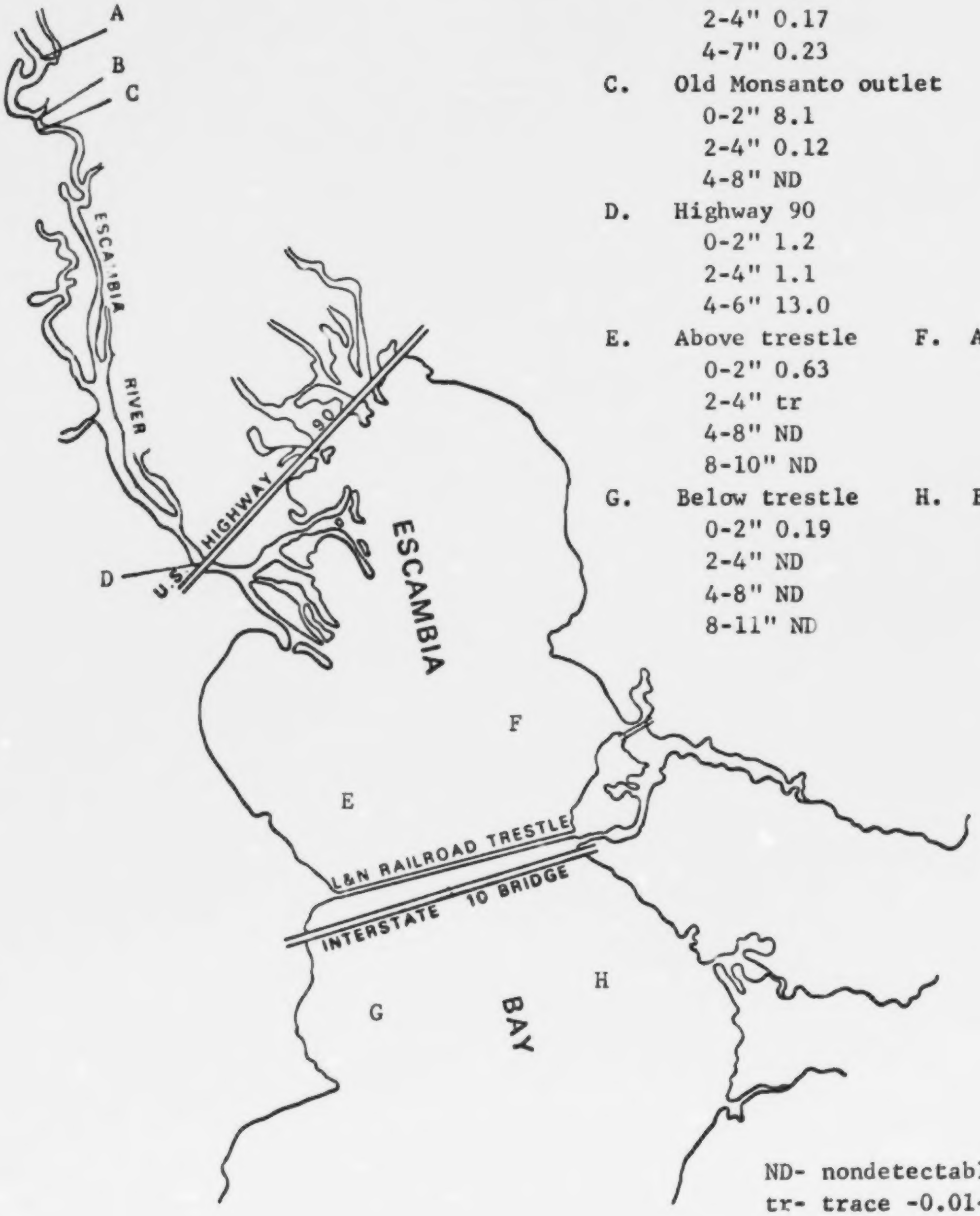
Figure 2. Concentrations (in parts per million) of Aroclor® 1254 in sediments from Pensacola Estuary.



ND- nondetectable <0.10 ppm
tr- trace - 0.01-0.05 ppm

144
18

Figure 3. Concentrations (in parts per million) of Aroclor® 1254 in sediment cores from Pensacola Estuary.



Location

A. Above Monsanto
0-2" ND
2-4" ND
4-7" ND

B. New Monsanto outlet
0-2" 0.13
2-4" 0.17
4-7" 0.23

C. Old Monsanto outlet
0-2" 8.1
2-4" 0.12
4-8" ND

D. Highway 90
0-2" 1.2
2-4" 1.1
4-6" 13.0

E. Above trestle
0-2" 0.63
2-4" tr
4-8" ND
8-10" ND

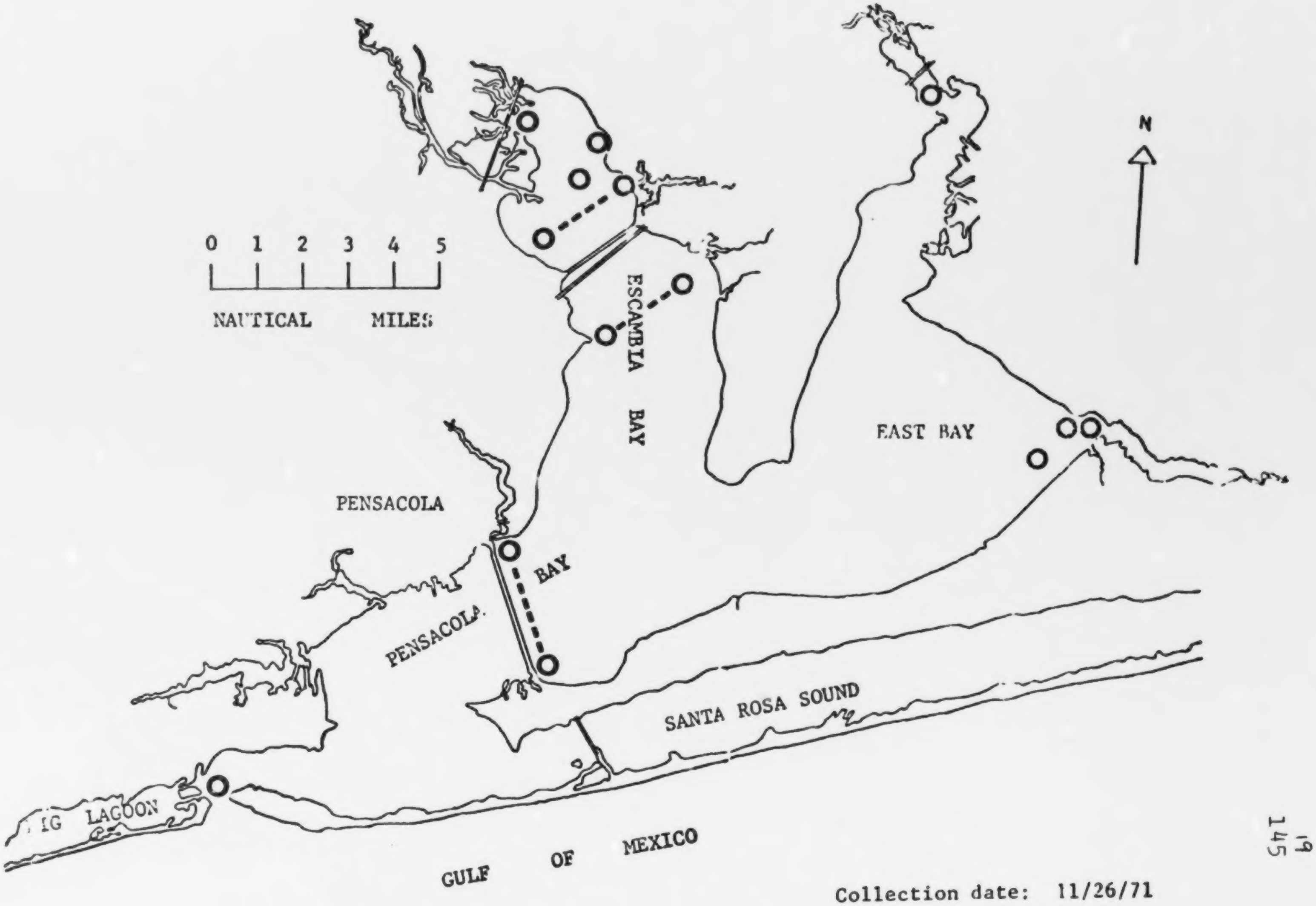
F. Above trestle
0-2" 1.2
2-4" tr
4-8" ND
8-12 ND

G. Below trestle
0-2" 0.19
2-4" ND
4-8" ND
8-11" ND

H. Below trestle
0-2" 0.18
2-4" ND
4-8" ND
8-10 ND

ND- nondetectable <0.10 ppm
tr- trace -0.01-0.05 ppm

Figure 4. Collection sites in Escambia and East Bays (biota only).



Collection date: 11/26/71

Table 1. Comparison in amounts of Aroclor® 1254 (parts per million (ppm) whole body) in samples of biota from East and Escambia Bays collected October 26, 1971.

Biota	Common Name	Scientific Name	East	Escambia
Plants		*Spartina sp*	ND	ND
		Zostera marina	ND	ND
Mollusks	Rangia	*Rangia cuneata*	ND	ND
		Neritina reclivata	ND	0.49
Arthropods	Brown and White shrimp	*Penaeus aztecus* and *P. setiferus*	tr (8)	0.98 (12)
	Blue crabs	*Callinectes sapidus*	0.46 (3)	6.9 (16)
Chordates	Bay anchovy	*Anchoa mitchilli*	0.68 (14)	3.0 (4)
	Sea catfish and Gafftopsail catfish	*Arius felis* and *Bagre marinus*	0.58 (2)	3.8 (2)
	Tidewater silversides	*Menidia beryllina*	0.95 (13)	10.0 (19)
	Silver perch	*Bairdiella chrysura*	0.48 (7)	4.5 (3)
	Sand seatrout	*Cynoscion arenarius*	--	1.5 (8)
	Spotted seatrout	*Cynoscion nebulosus*	0.12 (12)	--
	Spot	*Leiostomus xanthurus*	tr (10)	1.8 (7)
	Atlantic croaker	*Micropogon undulatus*	tr (9)	1.6 (10)
	Hogchoker	*Trinectes maculatus*	ND	1.3 (2)
	Atlantic cutlassfish	*Trichlurus lepturus*	0.72 (2)	2.9 (2)

ND - nondetectable $<$0.10 ppm
tr - trace = 0.01-0.05 ppm

Table 2. Comparison in the amounts of Aroclor® 1254 (ppm whole body) in samples of benthic organisms from the Pensacola Estuary collected Oct. 26, 1971.

Location	Number of Dredge hauls	Biota	PPM
Upper Escambia Bay (a line across the bay from a point 1 mile above Lora Point to a point 200 yds off the mouth of Mulatto Bayou)	13	Mollusca (1 bivalve)	1.3
Escambia Bay (a line from 200 yds. off Devil Point directed through the light to a point 200 yds. north of the upper boundary of Pearson's lease	10	Annelida (1 doz. annelids)	ND
		(1 doz. annelids)	0.57
		Mollusca (1 bivalve)	ND
		(3 mud snails)	ND
		Arthropoda (1 *Squilla* sp)	0.40
Pensacola Bay (a line along a north to south transect 200 yds. east of old Pensacola Bay Bridge)	18	Annelida and Nemertina (2 doz.)	0.12
		Mollusca (5 snails)	ND
		Arthropoda (3 *Palaemonetes* sp)	ND
		Chordata (2 fish)	0.29

Table 2. (continued)

Location	Number of Dredge hauls	Biota	PPM
Pensacola Bay Entrance (a line between Buoys 10 and 12)	15	Echinodermata (2 brittlestars)	ND
		Annelida and Nemertina (five annelids and 2 nemerteans	ND
		Mollusca (1 doz. bivalves and snails)	ND
		Arthropoda (3 snapping shrimp and 4 small xanthids)	ND
		Chordata (3 amphioxus)	ND

ND - nondetectable <0.10 ppm

Dr. T. W. Duke

DR. DUKE: The Environmental Protection Agency's Laboratory at Gulf Breeze, Florida, an associate laboratory of the National Environmental Research Center, Corvallis, Oregon, conducts research on the effect of toxic organic compounds, chiefly pesticides, on estuarine plants and animals and their environment. We have conducted some studies concerned directly with pollution in Escambia Bay and trust that these results will be helpful to the conferees.

My statement will cover three subjects: report of the conference of menhaden kills. This is a report of the conference that the conferees requested we hold.

The second, oyster mortalities in Escambia Bay.

And the third, survey for polychlorinated biphenyls.

Concerning the menhaden conference, the conferees of the Enforcement Conference held in Pensacola, Florida, on February 23 and 24, 1971, asked that a conference for menhaden fisheries be held to discuss the possibility of limiting the movement of juvenile menhaden into restricted bayous in Escambia Bay and contiguous waters. As you well know, we have experienced many fish kills in Escambia Bay during the past several years and in some instances a million or more menhaden were involved, although these were not the only fish involved.

The conference was held at the Gulf Breeze Laboratory on April 7, 1971, and was attended by representatives of the Federal and State governments and universities. A list of those attending the meeting is in the appendix. The discussions at the meeting covered five general topics: the biology and value of Gulf menhaden, cause of fill kills, the use of air curtains to restrict movement of fish, need for effective cleanup crews, and last, the introduction of predator species to control populations of menhaden. Participants in the conference reiterated that excess nutrients in the waters of Escambia Bay can cause a eutrophic or overenriched situation that results in low dissolved oxygen in the water. When a large population of fish enters a restricted area with low amounts of oxygen, a fish kill can be expected.

Mr. Chairman, with your permission I would like to ask a member of this conference at this time to give a brief talk on the biology of the menhaden. I think it might be helpful to us as we progress through the talk.

MR. WHITE: Fine. Ask him to come up, if you would.

DR. DUKE: All right. This is Mr. Marlin E. Tagatz, a fishery biologist, who was formerly with the National Marine Fisheries Service and is now with EPA at Gulf Breeze. Mr. Tagatz has performed quite a bit of research on the Gulf menhaden and I think his talk will be helpful to us.

MR. WHITE: Thank you.

MARLIN E. TAGATZ, FISHERY BIOLOGIST
SABINE ISLAND LABORATORY
ENVIRONMENTAL PROTECTION AGENCY
GULF BREEZE, FLORIDA

MR. TAGATZ: Mr. Chairman, conferees, ladies and gentlemen.

This report is partly based on a study by the National Marine Fisheries Service Laboratory, Beaufort, North Carolina, on that portion of the life history of the Gulf menhaden that occurs in the inside waters at Pensacola.

Collections were obtained during 1970 and 1971 from the Pensacola Bay Bridge and from Upper East Bay and Lower East Bay River.

Larval menhaden hatch in the Gulf of Mexico and after three to five weeks enter estuaries for further development. Spawning takes place near shore from late October through March.

Larvae enter the Pensacola inlet during a five-month period, December to April, and range in size from 10 to 30 mm, one-half to one inch total length. They are elongated, transparent, and without scales, and school by size from the time they enter the estuary.

Larvae were most abundant in February, five or six per cubic meter of water strained with a plankton net. Therefore, juveniles comprising the summer fish kills are first found in Escambia Bay as small larvae from December to May.

Early growth in the East Bay area was in low salinities or fresh water. As the young increased in size they moved downstream to the Lower Bay where salinities were over 10 parts per thousand or about one-third seawater.

Juveniles 30 to 50 mm, one to two inches, in April attained a size of 90 to 120 mm, three and a half to four and three-quarter inches, by August. Also abundant in August were much smaller fish from late season spawning. The small size of all catches after August indicated that most juveniles had moved toward the Gulf.

Schools of yearlings hatched the previous spawning season also appeared in the estuary from April to October. These were 90 to 130 mm, three and a half to five inches long, in April and over 150 mm, six inches long, in October. They probably enter the estuary from the Gulf to feed.

Menhaden, like mullet, are filter feeders on algae and the remains of higher plants. Also, they are near the bottom of the food chain and provide food for many carnivores

Some fish common to Escambia Bay that prey on menhaden are the silver perch, sea trout, croaker, sea catfish, ladyfish, lizardfish and flounder.

Since 1963 the menhaden has been the most valuable fish in the Gulf of Mexico. It is an industrial fish and not used for human food.

Products are fish meal for poultry and hogs, oil for lubricants, paints and soaps, and condensed solubles for protane supplement to animal feed.

Gulf menhaden catches set a new record in 1971, exceeding the historic record catches of Pacific sardine in 1936 and Atlantic menhaden in 1956. Over one and a half billion pounds were landed at 13 processing plants in only three States: Louisiana, Mississippi, and Texas. Half of the fish were one to two years old and half were two to three years old.

Eighty-five purse seine carrier vessels operated, each capable of carrying up to 350 tons of fish. An average set of the net yields from 20 to 25 tons of menhaden.

It has been estimated that for each one billion pounds in the commercial catch, 50 billion juveniles must grow up in Gulf estuaries.

Thank you. That is all I have, Mr. Chairman.

MR. WHITE: Thank you.

Mr. Levin.

MR. LEVIN: How long will it be, do you think, at the rate we are going, with the little ones dying up in estuaries and the big ones being taken away by the tons, before this whole thing just completely disappears?

MR. TAGATZ: Well, the Beaufort, North Carolina, Laboratory, the personnel there are concerned about the increase in the effort of the commercial fishery from year to year and feel that it probably has reached a point where no more effort should be involved.

MR. LEVIN: Are you saying that we have gotten to the point now that without some Federal legislation or whatever legislation it is going to take to stop these folks from--you said Texas, Louisiana and where?

MR. TAGATZ: Yes, Texas, Louisiana and Mississippi are the three States.

MR. LEVIN: --to stop them from doing what they are doing to menhaden, that eventually we are just going to be without that species of fish altogether?

MR. TAGATZ: Well, it is a commercial species, as I pointed out in point of commercial species, and they feel that they have probably reached the sustained yield with the effort of number of boats and number of plants. Although the catch has gone up, the effort also has gone up the past years.

MR. LEVIN: I don't know what that means.

MR. TAGATZ: The catch per unit of effort, the number of boats that are fishing, the size of net and the efficiency of the boats have also increased over the past years, which is involved in this large increase from year to year of the commercial catch of menhaden.

MR. LEVIN: Yes, but that doesn't do anything about these menhaden reproducing, does it, except that when you kill the adults, I assume, that that is going to be that fewer--

MR. TAGATZ: Juveniles.

MR. LEVIN: --juveniles?

MR. TAGATZ: Juveniles in the estuary, right. But this large volume of fish that is caught by the commercial fishery depends on success in all these estuaries in the Gulf because of the volumes of fish involved.

I am not sure I understand your question.

MR. LEVIN: Well, my question is, you know you can't pick up a magazine or a newspaper without hearing about the salmon, the tuna--

MR. TAGATZ: Right.

MR. LEVIN: --that are virtually going to become extinct if we don't start doing something about stopping the wholesale catch of these fish.

Now, based on what you have just said, myself, I am concerned about what is going to happen with the menhaden if, first of all, we don't do something about the estuary situation, and secondly, on the other hand, don't do something about stopping the catch of the grown-up menhaden for fertilizer and all this other thing that you mentioned.

Now, you have mentioned something that you all were concerned, that the scientists are concerned. Now, we are at the point to where we have got to start becoming concerned about the extinction of this fish. Now, am I right so far?

MR. TAGATZ: Not the extinction of the fish, but to maintain it at levels that it would be profitable for--it is a commercial species--for the processing and reduction plants to operate. On the Atlantic Coast they had tremendous records of catches too in 1956, and by increased effort the bottom of the catch just fell out and it became nonprofitable for many of the reduction plants to operate.

And they are looking at this as a possibility in the Gulf, that it is following in some ways the increased effort that was used on the Atlantic, that this could also take place in the Gulf and mean a reduction in the number of fish to make them commercially profitable, not as a matter of extinction.

MR. LEVIN: I am not so much worried about the commercial profit, for some reason or other.

MR. WHITE: I think Dr. Duke can help, too, if both of you gentlemen will stand there.

MR. TAGATZ: All right.

DR. DUKE: I believe I can answer. I see your concern. I believe I can answer it.

MR. LEVIN: I am concerned, first of all, about the extinction of the fish, and secondly, what effect is that going to have as a food supply for the other fish, which we have already been told is down 40 percent, see.

DR. DUKE: Right. You have got two good concerns and you have got one area in the Gulf where the National Marine Fisheries Service and biologists are working with the menhaden people to see that they don't overexploit the resource. They are working along that area. Your concern is right there.

The second is, it is very true that this is another reason we must protect our estuaries, because as Mr. Tagatz mentioned, these fish come in and grow. You heard how much they grow in the estuary. It is a nursery ground. Your concern is right there, again, why we must preserve the estuary.

So there are two things there that we must be looking at and your concern is justified and there is something going on in those.

MR. LEVIN: Doctor, let me ask you this. Is there any Federal legislation to control these people that you say are overseining the catches of these fish, that gives them the power to stop it if in fact they feel it is necessary?

DR. DUKE: To answer it truthfully, I don't know what their powers for stopping the commercial fishermen are. I know that the government is aware of this and exactly what powers they have I do not know.

MR. LEVIN: I have no more questions.

MR. WHITE: Mr. Ravan?

MR. RAVAN: Just one question.

I would like for you to explain exactly what you mean by filter feeder and is this at all depths?

MR. TAGATZ: They are primarily a surface schooling fish and they feed by just swimming in schools with their mouth open and straining small plankton through their gills out of the stream, particles that are caught up in their gills network, and it is primarily an algae and plant, although they do take small animal plankters too, but primarily plant material.

MR. RAVAN: Can one conclude from what you just said that they in fact will not feed down at the lower depths regardless of what that depth is, in other words skimming along the surface where the sediments are?

MR. TAGATZ: They can feed at the bottom depths if for some reason a school decides to lower its position. The plankton is most common in the upper layers of the water where it gets most light and as a result the menhaden follow the plankters in the area where they are common and that is in the surface waters.

MR. RAVAN: Then is it common or uncommon to find them feeding along the bottoms?

MR. TAGATZ: It is uncommon, because we have attempted to collect them at bottom depths in each bay with bottom trawls and they are much more abundant relative to the bottom at the surface than they are at the bottom. We use surface nets to collect them.

MR. RAVAN: Thank you.

MR. LEVIN: Can I ask another question?

MR. WHITE: Yes. Mr. Levin. Please do.

MR. LEVIN: Do you find as many in East Bay as you find in Escambia Bay?

MR. TAGATZ: I haven't made any studies in Escambia Bay. It has just been observations of the fish kill. But we have found a lot of menhaden in East Bay. For instance, we catch as many with a surface trawl about 20-foot wide net as 20,000 to 40,000, which is a considerable number.

But as far as the relative abundancy between Escambia and East Bay, all I can say is that there are a lot of menhaden in East Bay and obviously a lot of them in Escambia Bay.

MR. LEVIN: You see, what I am trying to get at, I talked to a friend of mine yesterday who does a lot of work in this particular field. He says that if you follow the migration of these fish from an airplane that you will see them come up to Garcon Point and just like somebody stuck out their hand for a left-hand turn and they just swing north into Escambia Bay.

And I was wondering if there is any particular reason or to be more specific is there anything that industry is discharging into this water that would necessarily attract those fish into that area as opposed to them going on up into East Bay?

MR. TAGATZ: Well, of course they are always pursuing food and Escambia Bay is very rich in algae and plankton because of the high nutrient values. This is one of the reasons the juveniles are in this area in huge numbers, because there is a ready food supply for them to feed on.

MR. LEVIN: And that is being supplied by the industries?

MR. TAGATZ: Right. I am not condoning this.

(Laughter.)

MR. LEVIN: No, no, I am not--I am trying to find out if there is any relationship that you know--maybe I might ask Dr. Duke this:

Is there any relation between the food being supplied for these fish by virtue of the number of TOC's in the water, whatever they happen to be?

MR. TAGATZ: Repeat that question. I am sorry.

MR. LEVIN: I am not even sure if I am asking the right question. (Laughter.) We just heard that Container is being nice to supply us with TOC's coming down the river, see, and I am just wondering if that contributes in any large amount to the food which is being supplied for these fish just before the trap door is sprung on them.

MR. TAGATZ: Right. Well, any nutrients that are in the river increase the algae bloom and as a result more fish will enter the area, but this, of course, is bad because if we have too many numbers of fish they reduce the oxygen again, have an oxygen demand, so although the food may be good the large numbers of fish that take advantage of it would be bad because their numbers would also hurt the oxygen level of these areas.

MR. LEVIN: Now, this could possibly be the dumbest question that has ever been asked. Does the color of the water, do you think, have any effect on attracting the young menhaden?

MR. TAGATZ: I really couldn't say. I don't know myself if a color of the water would be any attractant to menhaden.

MR. WHITE: I believe Dr. Duke, could you just clarify for us now the process of the creation of the algae and what-not from the nutrients? Would you go into that just briefly?

DR. DUKE: I don't believe I could answer the direct question that Mr. Levin asked any better than Mr. Tagatz, but certainly the phytoplankton blooms require nutrients, such as nitrogen and phosphorus, and so forth, and we have quite a few blooms and we have an excess of nutrients.

MR. WHITE: Mr. Traina.

MR. TRAINA: Mr. Tagatz, you mentioned that since 1963, I believe the date was, that menhaden has become a viable commercial fishery in the Gulf. Is there any significance to that date?

MR. TAGATZ: It seems that industry--I really don't quite understand the economics of why suddenly the fish became so important except that more money was invested and there seemed to be a shift of the populations from the Florida area to the areas of Louisiana, Mississippi and Texas, and--

MR. LEVIN: All ours are dead, that's why. (Laughter.)

MR. TAGATZ: I think part of it is from restrictions, too, in Florida to that type of net. They aren't able to fish there.

MR. TRAINA: It has nothing to do with the life cycle of the menhaden? I mean there were as many menhaden in 1958 as there were in 1963 and as there are now generally out in the Gulf?

MR. TAGATZ: I really don't know. I don't believe there are any records of the--

MR. TRAINA: In your studies of the menhaden cycle in the Gulf, how significant is this particular area, Escambia-Pensacola Bay? Have you made any estimates of the percent of the juveniles that come in here of the total population of menhaden into this area?

MR. TAGATZ: No. Some of the people from the Beaufort, North Carolina, Laboratory, National Fisheries Service Laboratory, have been involved in a tagging program of juvenile menhaden in estuaries from Florida to Texas and they tagged fewer fish, unfortunately, in this area and quite late, so they have had no returns of Florida juveniles in the commercial fishery in the Gulf, but they found that the juveniles that they tagged in Texas, Louisiana and Mississippi participated, were part of the fishery; in other words, juveniles in Texas could be caught in Mississippi or Louisiana, that they were traveling from an estuary to another State, off another State, and were caught. And I suspect that the very same thing may be true in Florida, although I have nothing to base it on at this time, but I believe the juveniles--

MR. TRAINA: In other words, fish that might be using this area here end up being caught off the areas of Louisiana, Mississippi and Texas?

MR. TAGATZ: I would believe that might be--

MR. TRAINA: In other words, the migration pattern is such that it involves all of these Gulf States?

MR. TAGATZ: I believe so. But as I say, this would have to wait until more tag returns, another year until we get some tag returns from the Florida juveniles.

MR. TRAINA: Have there been observations made of similar types of fish kills in other estuarine areas along the Gulf?

MR. TAGATZ: I really couldn't answer that. I am sorry, I really don't know.

MR. TRAINA: Thank you, sir.

MR. WHITE: Any other comments or questions?

Doctor, do you plan to go on?

DR. DUKE: Yes. I wanted Mr. Tagatz to make this presentation to talk a little bit about the biology of the menhaden and some of the problems involved so you might see the problems involved, how you cannot just say we will keep the menhaden out of a particular area. They come in very small and are difficult to work with in that respect.

Another item that was mentioned was the use of air curtains. Air curtains are often used across the entrance to a restricted area, and I will talk a little bit more about them later, to keep populations of menhaden from entering this particular area. The air curtain is a sheet of air bubbles formed by forcing compressed air through a perforated pipe laid across the bottom of a stream. It is a barrier, in other words. This was used in Mulatto Bayou in the summer of 1971 and observations indicated that the air curtain effectively prevented the fish from entering the bayou. Even so, the continuous operation of the air curtain presented some problems. To mention a few, the estimated cost to operate three air compressors for three months was about $10,000 and there was some equipment stolen and there were maintenance problems. Also we do not yet know what effect the air curtain has on keeping other animals, such as shrimp, other fish, crabs, from crossing into an area where we might want them to go.

It would be useful to introduce into the bay a predator, that is an animal that would feed on juvenile menhaden, as a tool for holding down the size of menhaden populations. Striped bass was discussed as a possible predator, but the participants dismissed the idea because little is known about the effectiveness of this fish as a predator on menhaden and there is a possibility that this predator might accumulate polychlorinated biphenyl or Aroclor 1254 that is in our bay, so this idea was dismissed.

The conferees of this menhaden conference felt that we could look forward to additional fish kills and that we must address ourselves to the need for a cleanup crew to remove dead fish from future kills. This, very briefly, was the discussion that went on at the conference. I would like to read three recommendations that came out of the conference:

Air curtains should be installed only in Mulatto Bayou to evaluate further their effectiveness as a barrier to passage of menhaden and to investigate the effect of air curtains on the ecology of the bayou and nearby waters.

A.work force could be created to respond quickly to remove dead fish from fish kills. The work force could consist of high school or college students, migrant laborers or others who would work on State and Federal highway projects, but would be free to respond quickly to a fish kill. The possibility of using fish as a fertilizer also should be investigated.

The third, controlled and limited dredging in the inlet to Woodland and Hoffman Bayous to remove obstructions and permit free circulation of water between the bay and contiguous waters.

Those in general were the recommendations of that conference.

Do you have any questions about the menhaden area before we go on?

MR. LEVIN: Would you mention that third one again, please?

DR. DUKE: Controlled, limited dredging in the inlet to Woodland and Hoffman Bayous to remove obstructions and permit free circulation of water between the bay and contiguous waters.

MR. LEVIN: Are there barriers there now?

DR. DUKE: Yes. Some members of the conference suggested that a fill was being--a ledge was being formed across the entrance to these and that there had been some fish kills when the fish got in and the water didn't circulate properly and didn't have the right amount of oxygen. It was thought that if this was open and the water permitted to circulate, possibly it might help the situation.

MR. WHITE: Any other comments?

MR. TRAINA: Dr. Duke, speaking of air curtains, did the conferees examine the effectiveness of the air curtains when they were in two summers ago and what did they conclude?

DR. DUKE: If I remember correctly, there were no in-depth studies of this, but observations of some of the folks from the University of West Florida. These people thought that when they were in operation they did in fact keep the menhaden from going up the bayou.

MR. TRAINA: The problem is to keep them in operation?

DR. DUKE: That is one big problem, yes.

MR. WHITE: I understand, too, that you didn't get into any depth of consideration of other things, such as nets across the bay, because of the logistical problems of maintaining such an apparatus?

DR. DUKE: It was brought up, but your point is correct.

MR. WHITE: Mr. Mauriello?

MR. MAURIELLO: I want to follow a train, Dr. Duke.

I think what we are saying is that there are plankton and algae blooms that are drawing the menhaden into the bay.

Is this a correct assumption?

DR. DUKE: This is an assumption, yes.

MR. MAURIELLO: That because of the volume that is there the large schools are being drawn in and that the algae and the phytoplankton are available through the nutrients that are available, whether it is combinations of carbon, nitrogen, phosphorus, whatever the case may be.

Did the conference go into any discussion concerning possibly breaking the chain of providing that source of food for the menhaden, mechanically possibly? Sunlight is a factor in the development of the phytoplankton or the algae blooms. During your conference did any discussion in controlling of the source of food--and let me put it in this respect, was any of this discussed?

DR. DUKE: I do recall that it was discussed and at the conference no one had the knowledge of what could be used at this time. For example, mechanical means, the bay is so large and it would be very difficult, the logistics would be difficult. The conferees did not accept the idea of chemical control of the algae. This was mentioned but dropped.

And these things were kicked around, but of those present we just did not have a good logical, feasible idea along that line.

MR. RAVAN: One further, if I may.

Doctor, would you state again why you thought it would be a good idea to put in this predator fish?

DR. DUKE: Yes. We thought if the menhaden populations--we were drawing them in and they were quite large, that perhaps we could cut down on the numbers of fish in the menhaden population by introducing predator fish. In other words, it is a biological control. It is something that happens; it is the balance of nature.

In other words, nature is out of balance. We have too many of the food fish. So it was discussed to bring it back in balance by introducing some predator fish that would eat the menhaden and possibly keep the population down.

MR. RAVAN: I am not sure I go along with that conclusion based on the fact that we see something happening at the beginning of this menhaden chain and large catches being taken at the upper end of the menhaden chain.

And lastly, the air curtains, the predator fish, or whatever means we want to use, isn't that an interim solution? It doesn't keep the menhaden from being killed?

DR. DUKE: That is a very good point. The conferees mentioned, and I hope that I stated it correctly at the beginning of this talk, that anything we do along this line is temporary. What has to be done is reduce the pollution in the bay. That is the point.

MR. RAVAN: Good. Thank you.

MR. WHITE: Any other comments or questions?

Do you plan to go on, Doctor?

DR. DUKE: I will do it quickly.

MR. WHITE: Well,go ahead, and I want to ask Mr. Tagatz one more question when you get through.

DR. DUKE: Do you want to go ahead?

MR. WHITE: It doesn't matter.

Mr. Tagatz, do you have specifics on that tagging study that is going on on menhaden? I mean are you thoroughly familiar with what the North Carolina Laboratory is doing in this area?

MR. TAGATZ: Not thoroughly familiar. I know, you know, what they are doing, but as far as numbers of tags, and so forth, that material will be available to me, but I don't know offhand.

MR. WHITE: Well, the thing that I am getting to, is there any way that we could accelerate this investigation of theirs that might give us any information that would be beneficial to us in considering this problem? Or do you think they are doing as much as they can now?

MR. TAGATZ: Well, this would be the goals and aims of that particular laboratory. They are involved with other things besides menhaden investigations and I guess it would be on a relative basis, depending on the director and what input he has from the people above him just how much time or effort he feels he can devote to such things as menhaden investigations in the Gulf or elsewhere. But certainly much more could be done in the Gulf in this regard, more fish should be tagged and closer records, more collections obtained.

MR. WHITE: The reason I am asking, I don't know that there is anything we could do, but conceivably we could work with a sister agency and see if we couldn't get more emphasis on this particular problem if you think that this would be beneficial in our endeavor here of understanding the problem.

MR. TAGATZ: No question about it, it would be beneficial to understanding the problem in Escambia Bay, any information we can have with regard to movements of juveniles, their feeding and the biology and life history of the animal. Unfortunately, Beaufort has de-emphasized their Gulf work and it is just right now a monitoring of commercial fishery and they are turning to other things.

MR. WHITE: Thank you.

Dr. Duke, if you would, please.

Dr. T. W. Duke

DR. DUKE: I will just continue, then. We will leave the menhaden conference and to the second item.

Our laboratory was involved in studies of oyster mortalities, oyster deaths, that reportedly occurred in Escambia Bay from September 2 through September 6, 1971. Investigators from our laboratory, in conjunction with personnel from The Florida Department of Natural Resources and local fishermen, collected oysters from beds on the east and west sides of Escambia Bay on September 8. Approximately 67 to 94 percent of the oysters collected from sites on the east side of the bay were dead. We took some of these oysters back to the laboratory and examined them in the laboratory and our pathologist, Mr. John Couch, found that the specimens indicated infections of Dermocystidium marinum, a fungus, and this infection ranged from heavy to light infection.

MR. WHITE: The conferees will refer to that as a fungus. (Laughter.)

DR. DUKE: Thank you.

Unfortunately, relatively few dying oysters or gapers were found in the samples and observations and collections were made at least two days after the major kill had occurred. However, from our laboratory analysis, it appears that this fungus was a large contributing factor in the mass mortality.

I will take just a minute to talk about this fungus in case you may not be familiar with it.

It is a parasitic marine fungus. It is found in tissues of oysters from bays and sounds and estuaries along from Texas to Maryland.

The fungus was first reported in 1950 by Mackin, Owen and Collier from oysters in Barataria Bay, Louisiana. Since 1950 the fungus has been studied extensively in almost every coastal State between Texas and Delaware. It has been shown in field and laboratory studies to be a natural and severe pathogen or disease-causing agent in the oyster.

The parasite is responsible for periodic heavy mortalities in oysters in some instances in late summer and early fall when water temperatures are high and the salt content is high for the water. Dr. Mackin and most scientists who have studied the fungus have reported that conditions such as fatigue, spawning, and adverse environmental conditions enhance the spread and intensity of infection and subsequent deaths.

The death of the oysters in Escambia Bay was reported to have occurred suddenly rather than over a long period of time as one normally would expect from an infection of this sort. Because of this, other factors, such as pollutants, freshwater influx, algal blooms, and possible overcrowding could have been involved as contributing stresses on the infected oysters.

That is the summary of the oyster mortality report. If there are questions on that, perhaps we can take them now.

MR. WHITE: Any questions?

MR. TRAINA: A couple, Tom.

You say the environmental conditions enhance the chances of infection. Is there any work being done in the laboratory or otherwise as to particularly what kind of environmental conditions, low pH's or, you know, what specific quality parameters might enhance this chance of infection?

DR. DUKE: I personally am not aware of it, Paul. I can ask the pathologist and he would probably know, but I think, from what I have read and understand, it is the general deteriorating conditions give problems.

MR. TRAINA: Another question, Tom. Do you have any estimates as to what the economic damage was due to this oyster kill that you experienced here?

DR. DUKE: We did not make that kind of investigation. I am really not familiar with it, but I think the State of Florida may have some information on that.

MR. TRAINA: Thank you.

MR. WHITE: Were there any other unusual circumstances that happened at about the time of the kill that may have contributed to the problem? I understand allegedly there was a dumping of some sort in the upper end of the bay?

DR. DUKE: Yes. This was reported. We did not investigate that, Mr. Chairman, but this has been reported through the State of Florida where a large amount, several thousand pounds, of nitrate was dumped at about this time.

MR. WHITE: I see. Any other comments or questions? You have one more?

DR. DUKE: I have one more subject.

MR. WHITE: That is right, I forgot, we have the PCB's. Please proceed.

DR. DUKE: I will talk just briefly now about the polychlorinated biphenyls. If you like, we will call those PCB's.

We continued to monitor the water, sediment and plants and animals of Escambia Bay and contiguous waters for Aroclor 1254. Aroclor 1254 belongs to a group of industrial chemicals called polychlorinated biphenyls or PCB's. As reported in the 1970 Escambia Bay Enforcement Conference proceedings, we traced one source of this PCB to an accidental leak at the Monsanto Chemical Plant located on Escambia River. This was reportedly a leak in the heat exchange fluid. Aroclor 1254 entered the Escambia River at the Monsanto weir, was carried downstream and is now in animals, sediment and water of Escambia Bay and contiguous waters.

The source of the leak was eliminated when Monsanto was notified of the problem in August 1969. Our latest survey, conducted on October 26, 1971, indicated that the concentrations of Aroclor 1254 at many locations in the river and estuary appear to have decreased since the survey one year ago. Nevertheless, Aroclor 1254 is still dispersed in this estuary, as indicated by recovery of the residue from animals, sediment and water collected from the various parts of the estuary. The chemical appears to be concentrated in higher levels of the food chain. For example, we found 0.12 ppm in worms and 10 ppm in silversides, a small fish. More detailed information of PCB concentrations in the water, near the Monsanto weir, and in various levels of the food chain are given in the appendix.

MR. WHITE: Comments or questions?

If not, thank you very much, Dr. Duke.

And we will take a 10-minute recess.

(RECESS)

MR. WHITE: Let's go back in session, please.

We are going to deviate slightly from the schedule that I outlined before. I understand in talking to Mr. Crockett we have the Mayor of East Brewton here and he needs to make a presentation and get back to take care of some business.

So we will call on Mr. Crockett for a partial Alabama presentation from the Mayor of East Brewton. When we get through with that, then we will go back to the State of Florida and pick up and go through with the entire presentation and then get back to the rest of the Alabama presentation at that time.

I believe Mr. Traina has a comment he wants to make.

MR. TRAINA: Just so we can maybe clear up the Federal one, I don't have any indications of any more Federal presentations to be made. I do want to acknowledge, though, representatives of the various following Federal agencies that have registered here:

The Navy Public Works Center here at Pensacola, the U. S. Bureau of Sport Fisheries and Wildlife in Atlanta, the U. S. Corps of Engineers in Mobile, the U. S. Coast Guard New Orleans, and the U. S. Coast Guard Mobile.

I would ask if any of these representatives would like to make a statement at this time? This is the time to make it.

If not, Mr. White, that concludes the formal Federal presentation.

MR. WHITE: I think we are ready with the Alabama presentation. I will call on Mr. Crockett for the Mayor of East Brewton at this time.

J. L. CROCKETT, JR.

DIRECTOR, TECHNICAL STAFF

ALABAMA WATER IMPROVEMENT COMMISSION

MONTGOMERY, ALABAMA

MR. CROCKETT: I would like to ask the Honorable Maury O. Weaver, the Mayor of East Brewton, to come forward and make a statement for the town of East Brewton.

While he is coming forward, Mr. Jordan, who is Chairman of the Water and Sewer Board of East Brewton, is here and also the representative of the engineering consulting firm who is drawing plans for East Brewton.

MAURY O. WEAVER

MAYOR

EAST BREWTON, ALABAMA

MR. WEAVER: Ladies and gentlemen, I am Maury O. Weaver, Mayor of East Brewton, and I appreciate the opportunity of giving a report to you on the status of construction of sewage treatment facilities for our community.

East Brewton is a relatively small town having a population of 2,511 in 1960. The 1970 census figures reveal that our community actually experienced a small decline in population during this 10-year period. I became Mayor in July 1970 and inherited the task of the planning, financing and construction of an adequate water board and sewage treatment system shortly after becoming Mayor.

After becoming Mayor I met with the water board and consulted the engineering firm and directed them to proceed with the development and design of a sewage treatment plant. Since that time our engineers have been involved in the preparation of plans and we have been working toward arranging for the financing of the needed facilities.

I am very happy to announce to you today that an application for a Federal grant to assist in the construction of a treatment plant has been processed by the Alabama Water

Improvement Commission and that it is in the Regional Office of the Environmental Protection Agency awaiting approval. I have just been told that final construction and plans and specifications of the above project have also been completed and have been approved by the Alabama Water Improvement Commission and is also in the Atlanta office awaiting Environmental Protection Agency approval.

I want to assure each of you here today that it is the intention of the city of East Brewton to proceed with the construction of required treatment facilities as promptly as possible following approval of our grant and plans and specifications. I have asked the representative of the engineering firm representing our city to be with us here today, also the water board chairman, Mr. M. C. Jordan. Should there be any question regarding this project, I will be glad to try to answer.

Gentlemen, we are doing everything possible. Now it is up to you, whoever is head of this Environmental Protection Agency, to approve these Federal grants. (Laughter.) Now, there it is on the table.

MR. WHITE: Thank you, Mayor.

MAYOR WEAVER: Are there any questions?

MR. LEVIN: Are you going to bring the engineer up here?

MAYOR WEAVER: Have you got any questions?

MR. LEVIN: Yes, sir, I sure do.

MR. RAVAN: Mr. Mayor, if you will, please, let me say, I am Jack Ravan, Environmental Protection Agency. It is a real pleasure to have you here with us today and I would like to ask a question.

When was this request for participation submitted?

MAYOR WEAVER: Well, I can give it to you. I didn't want to go into all these details. I didn't know you was going to ask me.

Have you got them? I have got them here. It will just take me a little time to find them.

MR. SPEAKS: I am Mike Speaks, with Polyengineering. The first application was submitted on April 14th.

MAYOR WEAVER: Is this what you wanted to know?

MR. RAVAN: To whom was it submitted in April?

MR. SPEAKS: To the Alabama Water Improvement Commission.

MR. RAVAN: And Mr. Crockett, when did that come to us?

MR. CROCKETT: I think this was sent on the application for Federal grant, I am not sure, but I believe all the details were completed and the package delivered to your office on Thursday or Friday of last week.

MR. RAVAN: Thank you very much. I want you to know that the Environmental Protection Agency will move with all due haste to return this application and if at all possible we will get an approval on it and get it back to you, Mr. Mayor.

MAYOR WEAVER: Thank you.

And there is one more thing. Whoever is head of this news media, I wish they would get them off of East Brewton's back. (Laughter.) Every time something comes up down here about this thing they throw it on East Brewton. And those fish are eating up what little we put in there before it gets to Escambia River. (Applause and laughter.)

MR. WHITE: Let me respond to that, Mr. Mayor. I appreciate your problem and I know you came into a very difficult situation. Of course you know we have no control over anything like this and I regret that this reflects badly on you.

But your predecessor in office or the former city council,I think,did not act expeditiously to get to this problem.And I think we would like to talk to your engineer now about some specifics, assuming that--

MAYOR WEAVER: O. K. Thank you.

MR. WHITE: Well, if you would like to stand, you may want to comment also, if you wouldn't mind.

Assuming that we get favorable action on this rapidly, and I feel certain that that will be forthcoming, what is the time frame for getting this project under way and completed?

MR. SPEAKS: The plans are completed. We could advertise as soon as, you know, we got approval on the grant. Now, the fiscal agent for the city says that he can sell the bonds necessary for the additional amount, so we could advertise as soon as we got notification of the grant.

MR. WHITE: What is your estimated construction period?

MR. SPEAKS: One hundred fifty days, working days.

MR. WHITE: Mr. Crockett?

MR. CROCKETT: Would the town of East Brewton have any difficulty in financing this project and constructing the project within the deadline of December 31, 1972, set by the second session of this conference if the approved plans are processed and approved by the EPA within a month's time?

MR. SPEAKS: No, sir. It could be possible, I mean it would be completed.

MR. CROCKETT: But anything that could be done by the Regional Office and Mr. Ravan to expedite this one project would certainly be helpful--

MR. SPEAKS: Yes, sir.

MR. CROCKETT: --in accomplishing the completion of this project within the deadline set?

MR. SPEAKS: Right.

MR. WHITE: Mr. Levin.

MR. LEVIN: Mr. Speaks, do you know of any other municipality or governmental agency that is using the Escambia River to discharge its sewage into, as far as Escambia River is concerned or Conecuh or whatever you all call it up there?

MR. SPEAKS: We are not associated with any other.

MR. LEVIN: I know you are not. I am just asking to your own knowledge do you know of any other cities that are using this--

MR. SPEAKS: No, sir.

MR. LEVIN: --letting the fish eat whatever little bit you all do? The fish eat it up is what you said.

MR. SPEAKS: That is what the Mayor said.

MR. LEVIN: That is what the Mayor said, right.

MR. SPEAKS: No, sir.

MR. LEVIN: Do you know of any other city?

MR. SPEAKS: No, sir.

MR. LEVIN: What system are you using now to get rid of the effluent?

MR. SPEAKS: The effluent presently is dumping untreated into the Murder Creek.

MR. LEVIN: And you say Murder Creek. Does that then go to the Conecuh River?

MR. SPEAKS: Yes.

MR. LEVIN: And how far downstream is the Conecuh River from the Murder Creek disposal point?

MR. SPEAKS: I would say approximately four miles. That would be a rough estimate.

MR. WEAVER: Is that to where your new disposal would be?

MR. SPEAKS: No, to where it is dumping now.

MAYOR WEAVER: Into Conecuh River?

MR. SPEAKS: Right.

MAYOR WEAVER: About four miles.

MR. LEVIN: Do I understand what is happening is that you all are gathering the wastes from these 2,511 citizens and gathering it into one central place and then just dumping it untreated into the Murder Creek?

MR. SPEAKS: Yes, that is right.

MR. LEVIN: Whenever you finish this plant, what will be the percentage of treatment that you all will have afforded this waste before you dispose of it--I assume you are going to dispose of the rest of it that is still in Murder Creek?

MR. SPEAKS: Right. Approximately 85 percent treatment.

MAYOR WEAVER: Mr. Speaks, let me interrupt for just a minute. We don't have the total sewage from 2,511. Tell him how many sewage customers we have.

MR. SPEAKS: There is 411 sewer customers now.

MR. LEVIN: What happened to the other 2,100?

MR. SPEAKS: They are on septic tanks or something else. They are not on city sewage.

MR. LEVIN: Let me ask Mr. Ravan this question:

Mr. Ravan, are you all going to approve a sewer treatment plant that only provides 85 percent removal?

MR. RAVAN: David, the question is well taken. Let me make a couple of comments.

The situation with regard to the town of East Brewton is not unlike the situation with small towns and municipalities throughout the Southeast. We find this not only the situation in Alabama, Georgia, Florida, South Carolina, and all the other eight States over which we have some interest.

As to the particular approval, first of all let me again express my feelings to the Mayor and Mr. Joe Crockett that in fact the Environmental Protection Agency, just having received this application, will act in all due haste. We will give the application full consideration and we look forward to working with both the State of Alabama and the town of East Brewton for an approval. We realize the seriousness of the situation and the untimely consideration now of this application.

And I realize, Mr. Mayor, that the problems of serving the people of East Brewton are not unlike problems associated with trying to serve the people at all levels. Therefore, we are all in this thing with you and we will do all we can now to get that application approved if in fact it is approvable.

David, we will take into consideration whether or not this is in fact addressing the whole problem or whether or not it simply satisfies what quickly could be considered to be a 20 percent addressing. If there are 2,500 people there and they all need service, our jurisdiction may end short of being able to connect every home in East Brewton to this particular system.

However, let me be quick to point out that there are in existence other programs, not necessarily under the umbrella of the EPA, which can get at this program and I couldn't say today whether or not that particular factor would gain the application a disapproval, and I certainly would be quick to add that we will do all we can to get the application in a form that can get it approved.

MR. WHITE: Mr. Crockett.

MR. CROCKETT: How many people are now served by the East Brewton system, how many of these 2,500 people?

MR. SPEAKS: Approximately 1,600.

MR. CROCKETT: I have just made some quick figures that those people would be discharging about 235 pounds of BOD. If the full population were treated they would discharge before treatment about 400 pounds. Now, if we gave it 85 percent treatment, then what would be discharged would be 60 pounds. So we are not talking about a major discharge.

MR. WHITE: Other comments or questions?

MR. LEVIN: I would just like to make this comment.

It seems nothing is a major discharge that comes into Florida and I just think that we are being rather shortsighted if in my judgment--now, don't misunderstand me, I would rather have 85 percent treatment than nothing, but we are requiring, I believe, 90 percent in Florida. Now, if they want to take this thing and dump it over in the Alabama River, that is all right with me, but when we have got a critical problem here in Escambia Bay I just don't think it is right for us to sit here and just wave our hands and say we really don't have any problem.

MR. WHITE: Well, of course, any source is a problem, but I would say this too, absent other factors indicating a need for a higher degree of treatment, and we have this in many instances, the normally accepted treatment level is 85 percent removal. I think Florida is to be commended for going to 90 percent. This is a step beyond what is being done nationally. But I do feel, too, that the nature of the discharge is such that what BOD is left would be exerted rather rapidly in the stream.

Any other comments?

If not, thank you very much, Mayor.

MAYOR WEAVER: I don't think you understood that we do plan to put everybody on sewage. That is in the plans.

MR. SPEAKS: They also have applied for HUD grant to sewer the whole town. We haven't heard from this grant. If and when it does come through, the city is going ahead to sewer the whole town.

MR. WHITE: Fine.

MR. RAVAN: That is what I was getting at. Our authority does not allow us to pick up that, as you already know, and if it will be of any assistance to you I will try to help along that line too and add my endorsement to the fact that the Department of Housing and Urban Development also should move quickly to get this grant approval.

MR. SPEAKS: Well, now, the HUD grant was also applied for at the same time that this grant was applied for, so as soon as it is processed we will go ahead with the rest of it.

MR. RAVAN: Thank you, sir.

MR. WHITE: Thank you, Mr. Speaks.

Well, I wanted to go just a little longer, but I would like to go off the record a minute now before we proceed.

(Off the record.)

MR. WHITE: Let's go back on the record.

We will proceed with the initial Florida technical presentation from the staff of the Florida Department of Pollution Control.

C. GILBERT MAURIELLO
DIRECTOR, OPERATIONS DIVISION
FLORIDA DEPARTMENT OF POLLUTION CONTROL
TALLAHASSEE, FLORIDA

MR. MAURIELLO: Mr. White, the first presentation, we would like to enter into the record a status report of our enforcement actions and I ask Mr. deCastro, the Head of our

Bureau of Enforcement, to make this presentation.

JOSE F. DE CASTRO, CHIEF
BUREAU OF ENFORCEMENT
FLORIDA DEPARTMENT OF
POLLUTION CONTROL, TALLAHASSEE, FLORIDA

MR. DE CASTRO: My name is J. F. deCastro and I am the Chief of the Bureau of Enforcement of the Department of Air & Water Pollution Control, State of Florida.

State involvement with the three major Florida industrial sources, Monsanto, American Cyanamid, and Escambia Chemical, dates back to mid-1969 when all three cases were served citations and orders to provide 90 percent minimum treatment to their liquid discharges.

Subsequently, in January of 1970 the conferees at the Pensacola Federal/Interstate Enforcement Conference on matters of Escambia Bay recommended, among other things, the removal of 94 percent carbonaceous and nitrogenous matter fro discharges of the three Florida industries and the Pensacola Northeast Sewage Treatment Plant. Also the removal of 90 percent carbonaceous waste from Container Corporation of America, a paper mill on the Escambia River at Brewton, Alabama.

J. F. deCastro

In February 1971, the Federal Enforcement Conference reconvened and recommended the reductions of biochemical oxygen demand, BOD_5, nitrogen and phosphorus discharges from Florida sources and the paper mill in Alabama to fixed maximum levels by not later than January 1 of 1973. Also established was the proviso that if reductions to said maximum discharge levels would not suffice the purpose, all polluted outfalls would have to be removed from Escambia Bay waters.

So far all Florida cases and the paper mill in Alabama have complied with all intermediate milestones set by the States and/or the Federal Enforcement conferees in the common goal to reach the target maximum discharge levels by January 1, 1973. Substantial reductions of BOD_5, nitrogen and phosphorus have so far been effected by Florida and the Alabama paper mill.

Notwithstanding the above reductions, massive fish kills have continued to plague Escambia Bay and no signs of enhancement are noticeable that would indicate eventual recovery of the bay even if the target maximum discharge levels as set by the Federal Enforcement Conference were attained by January 1, 1973.

In view of all the above, the State of Florida has reached the conclusion that nothing short of complete removal of polluted discharges to Upper Escambia Bay could prevent further degradation of said waters.

Based on the above conclusion, the State of Florida, Department of Pollution Control, has ordered Monsanto, American Cyanamid, and Escambia Chemical to remove their polluted streams from the river and abate not later than January 1, 1973, and the Pensacola Northeast Sewage Treatment Plant to provide advanced tertiary treatment by the same date. Industries have now requested public hearings.

Furthermore, upon recommendations of the Florida Department of Pollution Control and at the request of Governor Askew, this Federal/Interstate Enforcement Conference has reconvened today to consider, among other things, appropriate measures to restore Escambia Bay in light of substantial amounts of carbonaceous matter and nutrients flowing into Upper Escambia Bay via the Escambia River from upstream of known Florida sources.

In the case of Monsanto Chemical, the final orders for corrective action read as follows, just the items:

> The respondent will take immediate measures to insure that rainfall of such magnitude as can reasonably be expected shall not cause an overflow of pollutants to the

river.

Respondent shall not use, possess, or allow any polychlorinated biphenyls, PCB's, on its premises.

Respondent will continue to monitor the background level of PCB's in its intake and discharge.

Respondent shall complete and submit an interim report to the Department of Pollution Control by January 15 of 1972 containing a preliminary plan of action concerning the following:

a. A sound in-plant source control and wastewater management program that will completely eliminate present discharges of contaminated wastes and heat loads from Monsanto Chemical to waters of Escambia River.

b. An appropriate industrial waste pollution abatement plan to provide no less than 90 percent treatment to the volume of wastewater presently disposed of by deep well injection.

c. Combinations of a and b, or both, or any other feasible method that will achieve the same goals.

Monsanto shall continue to use approved equipment to continuously sample all effluent, and shall file with the Department monthly a record of all samples and a report setting forth the daily levels and monthly average of the following parameters:

Biochemical Oxygen Demand;

Nitrogen in parts per million and pounds per day;

Phosphorus in parts per million and pounds per day;

Carbonaceous matter in parts per million and pounds per day;

The volume in million gallons per day;

And the temperature of intake and receiving waters.

All the three companies have more or less the same orders.

In the case of the Northeast Sewage Treatment Plant, they have been issued a temporary permit to operate and the provisos call for the same reductions of 94 percent of BOD, 94 percent of nitrogen, and 90 percent on phosphorus.

Furthermore, a completion is set by April of 1972 and the permit will expire on January 1.

At this point I wish to stress once more that any pollution from the three major Florida sources and the Pensacola Northeast Sewage Treatment Plant no matter how small, no matter how low, is too much pollution. The State of Florida Department of Pollution Control wants their polluted streams out of Escambia Bay. However, it is my personal opinion that we should not ignore the substantial amounts of carbonaceous matter and nutrients in pounds per day, not milligrams per liter or parts per million, from either natural or artificial sources carried by the Escambia River into Upper Escambia Bay if we hope to restore the bay.

The fact that other Florida streams may also be loaded with carbonaceous matter and nutrients from natural or artificial sources should not, in my personal opinion, preclude the fact that we also have to clean up the Escambia River proper if we intend attempting to restore Escambia Bay.

This again is my humble personal opinion which may or may not be fully shared by others better qualified on the subject.

That is my statement.

(The above statement follows:)

STATE OF FLORIDA
DEPARTMENT OF POLLUTION CONTROL

FEDERAL ENFORCEMENT CONFERENCE
FLORIDA-ALABAMA
JAN. 24-25, 1972
ESCAMBIA BAY

JOSE F. de CASTRO, CH.E., P.E.
CHIEF, BUREAU OF ENFORCEMENT

State involvement with the three major Florida industrial sources - Monsanto, American Cyanamid and Escambia Chemical - dates back to mid 1969 when all three cases were served citations and orders to provide 90% minimum treatment to their liquid discharges.

Subsequently, in January 1970 the conferees at the Pensacola Federal/Interstate Enforcement Conference, on matters of Escambia Bay, recommended among other things the removal of 94% carbonaceous and nitrogenous matter from discharges of the three Florida industries and the Pensacola Northeast Sewage Treatment Plant. Also, the removal of 90% carbonaceous waste from Container Corporation of America, a paper mill on the Escambia River at Brewton, Alabama.

In February 1971, the Federal Enforcement Conference reconvened and recommended the reductions of biochemical oxygen demand, nitrogen and phosphorous discharges from Florida sources and the paper mill in Alabama to fixed maximum levels by not later than January 1, 1973. Also established was the proviso that if reductions to said maximum discharge levels would not suffice the purpose, all polluted outfalls would have to be removed from Escambia Bay waters.

So far all Florida cases and the paper mill in Alabama have complied with all intermediate milestones set by the States and/or the Federal Enforcement conferees in the common goal to reach the target maximum discharge levels by January 1, 1973. Substantial reductions of BOD_5, nitrogen and phosphorous discharges have so far been effected by Florida sources (see fig.) and the Alabama paper mill.

Notwithstanding the above reductions, massive fish kills have continued to plague Escambia Bay and no signs of enhancement are noticeable that would indicate eventual recovery of the bay even if the target maximum discharge levels as set by the Federal Enforcement conferees were attained by January 1, 1973.

In view of all the above, the State of Florida has reached the conclusion that nothing short of complete removal of polluted discharges to upper Escambia Bay could prevent further degradation of said waters.

FLORIDA SOURCES (3 IW & 1 MS)
UPPER ESCAMBIA BAY

PARAMETERS	Fed. '69 Report (1000)'s	DPC '72 Lab (1000)'s	Fed. '73 Target (1000)'s
BOD_5	15.4	8.5	1.1
TOT "N"	15.5	8.6	1.1
TOT "P"	1.0	0.3	0.1
POP. EQUIV. "N"	645	334	46

Based on the above conclusion, the State of Florida, Department of Pollution Control, has ordered Monsanto, American Cyanamid and Escambia Chemical to remove their polluted streams from the river and bay by not later than January 1, 1973, and the Pensacola Northeast Sewage Treatment Plant to provide advanced - tertiary - treatment by the same date. Industries have requested public hearings.

Furthermore, upon recommendations of the Florida Department of Pollution Control and at the request of Governor Askew, this Federal/Interstate Enforcement Conference has reconvened today to consider among other things appropriate measures to restore Escambia Bay in light of substantial amounts of carbonaceous matter and nutrients flowing into Upper Escambia Bay via the Escambia River from upstream of known Florida sources.

MONSANTO CHEMICAL COMPANY CASE NO. IW-260-70

Escambia County ORDER NO. 355

@FINAL ORDERS FOR CORRECTIVE ACTION - DECEMBER 16, 1971

1. Respondent will take immediate measures to ensure that rainfall of such magnitude as can reasonably be expected shall not cause an overflow to the River.

2. Respondent shall not use, possess, or allow any Polychlorinated biphenyls on its premises.

3. Respondent will continue to monitor the background level of PCB's in its intake and discharge.

4. Respondent shall complete and submit an interim report to the Department of Pollution Control (c/o the Bureau of Enforcement) by January 15, 1972, containing a preliminary plan of action concerning the following:

a. A sound inplant source-control and wastewater management program that will completely eliminate present discharges of contaminated wastes and heat loads from Monsanto Chemical to waters of Escambia River.

b. An appropriate industrial waste pollution abatement plan to provide not less than 90% treatment to the volume of wastewater presently disposed of by deep well injection.

c. Combinations of a and b in addition to any feasible methods that will achieve the same goals.

5. Respondent shall continue to use approved equipment to continuously sample all effluent, and shall file with the Department monthly a record of all samples and a report setting forth the daily levels and monthly average of the following parameters:

Biochemical Oxygen Demand in parts per million and pounds per day

Nitrogen in parts per million and pounds per day

Phosphorous in parts per million and pounds per day

Carbonaceous Material in parts per million and pounds per day

The volume in million gallons per day

Temperature of intake and receiving waters

6. Respondent shall by January 1, 1973, provide secondary waste treatment of all wastes which are disposed of through subsurface disposal wells.

7. After December 31, 1972, no waste water containing pollutants or contaminants shall be discharged into Escambia River from Respondent's facilities.

* * * * * * *

AMERICAN CYANAMID COMPANY CASE NO. IW-227-69

Santa Rosa County ORDER NO. 358

@FINAL ORDERS FOR CORRECTIVE ACTION - DECEMBER 16, 1971

1. Respondent shall take immediate measures to ensure that rainfall of such magnituce as can reasonably be expected shall not cause an abnormal discharge of waste into Escambia Bay.

2. Respondent shall complete and submit an interim report to the Department of Pollution Control (c/o the Bureau of Enforcement) by January 15, 1972, containing a preliminary plan of action concerning the following:

@Note: Preambles not included.

a. A sound inplant source-control and wastewater management program that will completely eliminate present discharges of contaminated wastes to waters of Escambia Bay.
b. An appropriate industrial waste abatement plan to provide by January 1, 1973, not less than 90% treatment to the volume of wastewater contemplated to be disposed of by deep well injection (if applicable).

3. Respondent shall continue to use approved equipment for continuously sampling all effluent, and shall file with the Department monthly a record of all samples and a report setting forth the daily levels and monthly average of the following parameters:

Biochemical Oxygen Demand in parts per million and pounds per day

Nitrogen in parts per million and pounds per day

Carbonaceous Material in parts per million and pounds per day

Phosphorous in parts per million and pounds per day

The volume in million gallons per day

Temperature of intake and receiving waters

Respondent shall file monthly a monitor record and a report setting forth the daily and monthly average load of each contaminant.

4. After December 31, 1972, no wastewater containing pollutants or contaminants shall be discharged into Escambia Bay from Respondent's facilities.

The Orders for Corrective Action, upon becoming final and effective shall supersede and supplant all previous Orders issued by the Department concerning the Santa Rosa plant.

* * * * * * *

AIR PRODUCTS AND CHEMICALS, INC. CASE NO. IW-226-69

Santa Rosa County ORDER NO. 356

FINAL ORDERS FOR CORRECTIVE ACTION - DECEMBER 15

1. Respondent shall take immediate measures to ensure that rainfall of such magnitude as can reasonably be expected shall not cause an abnormal discharge of waste into Escambia Bay.
2. Respondent shall complete by January 15, 1972, Dr. James Lackey's recommendations as follows:

a. Construction of an additional so called Echo Pond Biological system to increase the overall treatment volume to approximately 99 million gallons.

b. From time to time remove from Alpha and Bravo ponds duckweed and other vegetation in order to maintain sufficient open water in these ponds to support photosynthesis which will result in aerobic surfaces. This will be a continuing operational item.

3. Respondent shall complete by January 15, 1972, the second portion of the proposed inplant source-control program that will result in a reduction of 1/2 mgd of the flow generated at the chemical plant.
4. Respondent shall conduct an engineering study of the first portion of the proposed inplant source control program set forth in its report of September 30, 1971, which has as its objective a 1 mgd reduction of the average effluent generated by Respondent's plant. Respondent shall report the outcome of this study to the Department no later than March 1, 1972.

JOSE F. de CASTRO, CH.E., P.E.
CHIEF, BUREAU OF ENFORCEMENT

5. Respondent shall continue efforts to locate, identify, and eliminate or control underground source of contaminated water seeping into the retention pond insofar as Respondent is responsible for the contaminants therein.

6. Respondent shall complete and report to the Department of Pollution Control, Bureau of Enforcement, by October 1, 1972, a thorough technical reevaluation of:

a. Spray irrigation disposal of the reduced volume that will generate from the chemical plant after completion of this program.
b. Deep well disposal of the above reduced volume.
c. Combinations of a and b in addition to any other feasible methods that will reduce discharges from the Escambia Plant to waters of Escambia Bay.

7. After December 31, 1972, no waste water containing pollutants or contaminants shall be discharged into Escambia Bay from Respondent's facilities.

8. Respondent shall continue to use approved equipment to continuously sample all effluent, and shall file with the Department monthly a record of all samples and a report setting forth the daily levels and monthly average of the following parameters:

Biochemical Oxygen Demand in parts per million and pounds per day

Nitrogen in parts per million and pounds per day

Phosphorous in parts per million and pounds per day

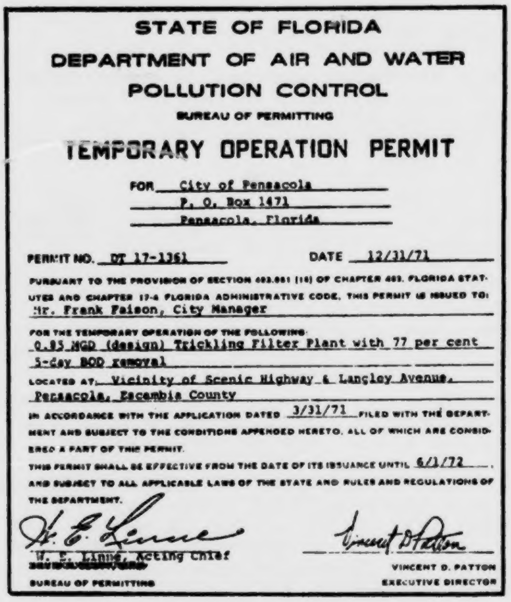
Carbonaceous Material in parts per million and pounds per day

The volume of flow in million gallons per day

9. Respondent shall conduct an engineering study to determine the feasibility of isolating the plant's process waste water and the biological ponds from general surface water runoff. Respondent shall report the outcome of this study to the Department no later than May 1, 1972.

* * * * * * *

CITY OF PENSACOLA - NE SEWAGE TREATMENT PLANT



STATE OF FLORIDA
DEPARTMENT OF AIR AND WATER POLLUTION CONTROL
BUREAU OF PERMITTING

TEMPORARY OPERATION PERMIT

FOR City of Pensacola
P. O. Box 1471
Pensacola, Florida

PERMIT NO. DT 17-1361 DATE 12/31/71

PURSUANT TO THE PROVISION OF SECTION 403.061 (16) OF CHAPTER 403, FLORIDA STATUTES AND CHAPTER 17-4 FLORIDA ADMINISTRATIVE CODE, THIS PERMIT IS ISSUED TO: Mr. Frank Faison, City Manager

FOR THE TEMPORARY OPERATION OF THE FOLLOWING: 0.85 MGD (design) Trickling Filter Plant with 77 per cent 5-day BOD removal

LOCATED AT: Vicinity of Scenic Highway & Langley Avenue, Pensacola, Escambia County

IN ACCORDANCE WITH THE APPLICATION DATED 3/31/71 FILED WITH THE DEPARTMENT AND SUBJECT TO THE CONDITIONS APPENDED HERETO, ALL OF WHICH ARE CONSIDERED A PART OF THIS PERMIT.

THIS PERMIT SHALL BE EFFECTIVE FROM THE DATE OF ITS ISSUANCE UNTIL 6/1/72, AND SUBJECT TO ALL APPLICABLE LAWS OF THE STATE AND RULES AND REGULATIONS OF THE DEPARTMENT.

W. E. Linne
W. E. Linne, Acting Chief
BUREAU OF PERMITTING

Vincent D Patton
VINCENT D. PATTON
EXECUTIVE DIRECTOR

Temporary Operation Permit Conditions (Excerpts)

1. The existing level of treatment is not in compliance with Section 17-3.04 Florida Administrative Code.

Consistent removals of no less than 94 percent 5-day BOD and suspended solids, 94 percent total nitrogen and 90 percent total phosphorous before discharge to area surface waters shall be obtained.

a) Completion of upgrading as required by this permit: April 1, 1972

b) This temporary permit will expire on: June 1, 1972.

MR. WHITE: Thank you.

Mr. Levin.

MR. LEVIN: Mr. deCastro, you mentioned the date of January 15 that these industries were supposed to submit plans to our Department--

MR. DECASTRO: Yes, sir.

MR. LEVIN: --as to how they are going to go about being out of the bay by January of 1973.

MR. DE CASTRO: Yes, sir.

MR. LEVIN: Have you received those?

MR. DE CASTRO: No. Precisely one of the reasons for the submittal of our application for public hearing was based on that deadline. When they apply for a public hearing or submit a request for a public hearing that stays until the hearing is held.

MR. LEVIN: How soon have we set up those public hearings?

MR. DE CASTRO: The legal department, the legal group, is the one that sets those dates and I think they are forthcoming shortly. They have got to find an office, and so on. So far as our Administrator, enforcement stays until that public hearing is held.

MR. LEVIN: Have the members or representatives of these industries gotten together with you to indicate to you that it is not possible for them to meet these orders?

MR. DE CASTRO: That came up, sir, when we had the informal conference prior to issuance of the final orders, yes. They think it is too short a time and that--they haven't refused to do it, but they feel that they have too short a time to come up with something and the intent was more or less to have the reply, the formal reply, by the time of this conference. That was why we set that date as a deadline, sir.

MR. LEVIN: Do you feel like that this public hearing ought to be in front of our full board rather than in front of an examiner? I don't mean this board. I am talking about the Pollution Control Board of Florida. If so, I would like to set that meeting up just as soon as possible.

MR. DE CASTRO: Mr. Levin, in my personal opinion, perhaps yes, but I don't dare to issue an opinion in the name of the Department.

MR. LEVIN: Now, did I understand that you said that the Northeast Sewer Treatment Plant has indicated they will have arrived at tertiary treatment by January of 1973?

MR. DE CASTRO: Yes.

MR. MAURIELLO: Mr. Levin, could I interrupt here? Mr. Linne is going to bring us a complete report on the status of the Northeast plant.

MR. LEVIN: O. K. You mentioned something that intrigues me. You do not agree, obviously, with the report of the EPA people concerning the damage, if you want to use that word, being done to the bay by Container or some source coming down the Escambia River?

MR. DE CASTRO: As far as I know, sir, Container is doing a good job and the results I have seen from the Federal people is very encouraging, but definitely my point is that unless the river is cleaned up, the upper river is cleaned up, we won't accomplish much by doing our part of the business.

MR. LEVIN: I know, but there is a gap in what you are saying.

MR. DE CASTRO: It may be natural sources or whatnot, but it is there, sir.

MR. LEVIN: Well, we can't do anything about natural sources. The thing I am trying to find out is whether or not in your judgment--you say Container is doing a good job, I think probably Monsanto is doing a good job, but the question is whether or not they are doing a good enough job to restore the bay. This is what I am worried about. Now, we have ordered the Florida industries to be out of the bay.

MR. DE CASTRO: Yes, sir.

MR. LEVIN: So we are not discriminating against Alabama industries in any way if we ask that this Federal conference require the same thing to come out of Alabama. Now, do you feel like that that is a necessary step to get Container Corporation out of the river in order for this bay to be restored?

MR. DE CASTRO: That wouldn't be enough, sir, that is my opinion.

MR. LEVIN: What else will we have to do besides getting the 60 pounds from East Brewton?

MR. DE CASTRO: Find out where the rest of the nutrient combination matter are coming from and see if they can be somehow abated.

MR. LEVIN: Do your figures agree with the figures of EPA as to the carbonaceous wastes, and so forth, coming down the river?

MR. DE CASTRO: Well, for example, the figure of 4.5 ppm was mentioned. What flow? Because that may be in the perhaps quarter million pounds per day. See, the ppm doesn't mean much unless you have the flow of the river and that could be a tremendous amount of--I don't know whether it was a total of any carbon or what. The figure 4.5 ppm was mentioned.

MR. LEVIN: Well, if these men are still here from the EPA, would you mind getting together with them at lunch time and letting us know what--

MR. DE CASTRO: Let me just point out, Mr. Levin, I do not have that portion of the study. I am only enforcement. I am just pointing out if we want to solve the problem of the bay we should look at the rivers and not just the specific cases we know.

MR. LEVIN: Do you feel like that it is possible that the readings that we are getting in the river might necessarily be covering all of the problem? For example, we may be getting one reading out of the river and yet the flow of the river have something to do with the fact that it would appear that the river would have no serious contribution to the problem whereas by the time it makes its way into the bay it then becomes a part of the problem? Is this--

MR. DE CASTRO: Well, when you multiply, sir, the ppm times the flow, and at times, it is usually--I mean the average is 6,000 CFS, cubic feet per second, but it goes up as high as 30,000, 40,000 for weeks, and when you multiply the ppm, no matter how low, by that flow, you end up with huge amounts of carbonaceous matter, total organic carbon, that is what I am pointing out, sir.

MR. LEVIN: And you are saying--

MR. DE CASTRO: The river shouldn't be ignored if we have as a common goal the restoration of Escambia Bay.

MR. LEVIN: You are saying that in your judgment, with the present state of eutrophication of Escambia Bay, that we are not going to be accomplishing anything if we permit, after we get local industry out of the bay, after we get whatever happens to Gulf Power, what happens to them, what happens to the Northeast sewer treatment plant, that we are still not going to be solving anything if we permit Container Corporation and East Brewton--and I apologize for using the name of a city--but if we permit them to continue to go into the river? Is this basically what you are saying?

MR. DE CASTRO: Mr. Levin, I am not singling out anyone. I don't know where it is coming from.

MR. LEVIN: I am doing that, Mr. deCastro.

MR. DE CASTRO: I want to make that clear because I don't want to single out anyone. What I am saying is--

MR. WHITE: May I interject something here?

MR. DE CASTRO: Yes, sir.

MR. WHITE: If you will excuse me, please.

Mr. deCastro, is there anything that much different from this stream to any other stream that has no pollution point source discharging into it? Would not another river removed over--and I forget the names of all of these rivers--but the poundage loading that you are talking about would be high in those rivers also, is this not correct?

MR. DE CASTRO: Mr. White, as far as the Escambia Bay is concerned, it makes 100 percent difference. What I am saying is that regardless of what is coming down other rivers, if this is there--let me summarize. If all industry was putting out--industry and the sewage treatment plant was putting out,let's say,6,000 pounds of total nitrogen into Upper Escambia Bay and the river is putting in,let's say,10 times as much, I would say that the problem is proportionate. That is my point, sir.

MR. WHITE: Well, just one point there. Wouldn't you say that there is a difference between where the discharge goes into the bay as it relates to flushing?

MR. DE CASTRO: Oh, definitely. I mean I am not--let me make this clear again. I am enforcement. However, I made this statement on my own. I am not an expert on pollution, but I would say yes, definitely.

MR. WHITE: Thank you.

MR. DE CASTRO: The conditions of the bay are such that perhaps they are conducive to problems. What I am pointing out is that if 6,000 pounds from industry is a problem, let's say 60,000 or 600,000 from the river, it should be either 10 or 100 times more is my whole point.

MR. LEVIN: See, the thing that it is hard for me to get through my thick skull is if in fact Container Corporation and other cities are dumping into Escambia River, it stands to reason that if there are other natural sources coming down the river that anything we can get out of there has got to be an improvement.

MR. DE CASTRO: Definitely, sir.

MR. LEVIN: So that if we compare the Escambia River with the Choctawhatchee River and they compare favorably and the Choctawhatchee River does not contain any discharge from any other source, then we are going to be that much better off, obviously, if we pull out whatever man is putting into the river. Doesn't that make sense or am I wrong?

MR. DE CASTRO: Yes, sir, I think so. We have got to bear in mind, sir, that the Escambia drainage area is close to 4,000 square miles.

MR. LEVIN: In other words, I can't see the sense in requiring Florida industries not to be given the same leeway that Alabama industries are given. If in fact the people in the State of Florida have required or see to it that they are requiring Florida industries to get out of the river, I can't understand why--well, maybe we have not gotten to that point yet. But it would seem like to me that anything that we can get out of the river is going to help to restore that bay that much faster.

MR. DE CASTRO: That definitely. How significant depending on the amount of the contribution, but definitely. A pound less is a pound of improvement, no question about it.

MR. WHITE: I believe Mr. Ravan has a question.

MR. DE CASTRO: Yes, sir.

MR. RAVAN: Mr. deCastro.

MR. DE CASTRO: Yes, sir.

MR. RAVAN: I agree with the philosophy stated here that something is better than nothing in terms of getting rid of pollutional load and that we all ought to work towards perfection if that is attainable. Whether or not it be attainable, it is certainly an admirable goal.

However, do you have, does the State of Florida, do you have now or have you conducted any studies that would tell us exactly what is the pollutional load coming down the river?

MR. DE CASTRO: Not my bureau, sir, I do not have that data.

MR. MAURIELLO: Mr. Ravan,may I attempt to answer that?

MR. RAVAN: Surely.

MR. MAURIELLO: I believe, and Mr. Little can back this up, that we supplied some information as well as Alabama, Mr. Crockett and the Alabama Water Improvement Commission, as to evaluations of other streams entering Alabama or entering from Alabama into Florida. Now, coupled with the survey that was conducted we both--I guess all three groups went back into the data and dug this out, and I believe this is where a majority plus the evaluations that were made overreached itself, where Mr. Little's report stimulated from.

I think the point that we are--one of the points that we are missing, and we have discussed this, is that it is very possible that with the loads coming from Alabama that the Escambia situation is slightly different because we do have the nitrogen and phosphorus that the State of Florida is putting into Escambia Bay. We are not sure at this time whether Choctawhatchee Bay, which is the estuary of the Choctawhatchee River, or even some of the other bays may not be in this same--not same type of condition, but very close to it. This is a question that still we have to answer ourselves.

MR. RAVAN: I would like to get back to the point, then.

It would appear from what you have just said that if this was a three-way participation study that in fact the report made here by Mr. Little represented, could we say, your best thinking, the State of Florida's best thinking with regard to the present day situation?

MR. MAURIELLO: Yes, sir, I think--I believe the answer -- that is yes, that it is. There is some concern here, though, and this is, I think, part of the thing that Mr. deCastro was speaking to is that there are some loads of carbonaceous material that may still be in existence in the Escambia River basin that may not be present in other areas which needs to be explored.

MR. RAVAN: And the State of Florida has not conducted independent studies, especially over the last three years, to tell us what the pollutional load is coming down the Escambia River?

MR. MAURIELLO: Our monitoring of the river is a continuous type thing and it was incorporated into the data that we submitted back in preparation for Mr. Little's report, so it was included, any of the background data that we had.

MR. RAVAN: Could either you or Mr. deCastro offer a suggestion as to what we might do to find out exactly even more in depth or perhaps better define where that pollutional load is coming from and what effect it is having?

MR. MAURIELLO: I think--go ahead.

MR. DE CASTRO: No, no, that is not my bureau, sir. I am enforcement. That will be the Division of Operations.

MR. MAURIELLO: I think we realize that there are many uncontrollable, and Mr. Little spelled this out, there are uncontrollable natural sources that are in the drainage basin, not only in the Escambia-Conecuh Basin but in the Perdido and the Choctawhatchee and everywhere else, and this is a land runoff type of problem. And I believe that everybody has indicated, Alabama as well as Florida, that have pinpointed the sources of pollution. There is no question that we know where the sources of pollution are, but the--

MR. RAVAN: You are talking about the manmade sources?

MR. MAURIELLO: The manmade sources, right.

MR. RAVAN: Well, good. I think we are all working towards the same common goal, which is to rectify, first of all, the problem that exists and then somehow get to its recovery. And anything that you might have, Mr. deCastro, in terms of a suggestion, we would be happy to hear.

MR. DE CASTRO: May I make a comment?

MR. WHITE: Yes, please.

MR. DE CASTRO: For example, I think one point of interest would be to go out and find out what is in this 4,000 square miles drainage area.

MR. WHITE: Excuse me, please. Would you speak up louder?

MR. DE CASTRO: One point that I would suggest to figure out or find out, what is within that 4,000 square miles of drainage area of the Escambia River and all its streams.

MR. RAVAN: In other words, you think there is something there other than natural?

MR. DE CASTRO: No, sir. It may be Mother Nature. But unless we abate Mother Nature, what--

MR. RAVAN: An aerial or surface survey, then, to find out what is there?

MR. DE CASTRO: I am not saying any one, sir. I think we have been too much concerned with known sources that we have completely ignored the unknown sources. That is what I am trying to make clear.

MR. TRAINA: Do you have information, Mr. deCastro, that indicates that there are point sources that we have not addressed to this conference?

MR. DE CASTRO: Let me make this very clear. I don't. Let's assume that it is Mother Nature, from things I have observed.

MR. WHITE: Mr. Crockett, do you have a question?

MR. CROCKETT: Mr. deCastro, you are not saying that there are streams which have no point sources of pollution, that are completely free from BOD? I don't think you said that. I think you have recognized that there are concentrations of BOD that are going to be found in streams of Florida as well as those of Alabama,Tennessee, Georgia, and Mississippi without point sources of pollution on them. There are concentrations that may range from a part to a part and a half per million.

If I understand what you have said, you haven't said that this was from point source, but you said it ought to come out.

Now, of course, there is another thing, and I am sure that you will accept and recognize, that any BOD of an organic nature, which is about all we have in Alabama, that is introduced is stabilized where it can't be found, it is stabilized in the course of travel downstream. I think that has to be accepted.

There are sources of BOD that come from natural runoff, from the drainage, particularly after heavy rains, of a metropolitan area, stormwater is a problem.

Of course we worked on Conecuh-Escambia River as far back as 1956 and it may be interesting to know that during the course of one of these studies at the Century Bridge, Highway

4, Florida, that concentrations of as high as 2.5 ppm were found when flows were in the order of 15,000 cubic feet per second. Now, this was before Container came on the scene.

MR. DE CASTRO: That is--may I?

MR. WHITE: Yes, if you would. But briefly answer. I think we need to move on. We were kind of bogging down on this and not accomplishing anything. I think we have got some other testimony this afternoon that might shed a little more light on this area that we are addressing now.

But if you want to make a specific comment.

MR. DE CASTRO: Yes, I agree with him fully, but what about total organic carbon? That was encountered by the river way down, sir, and I have seen huge figures at Century. As I say, I am not pinpointing any source. It may be Mother Nature. But if it is Mother Nature, what is the solution there?

MR. WHITE: Fine. Can I cut this off now and could we get together maybe, I mean the technical staffs and discuss this a little more--

MR. CROCKETT: Right.

MR. WHITE: --unless there are other comments?

MR. LEVIN: Confined specifically to how much total organic carbon, is that the thing that concerns you?

MR. DE CASTRO: For example, the figure of 4.5 ppm was mentioned here. What was the flow?

MR. LEVIN: In other words, I would like to find out specifically what specific points of pollution in Alabama are contributing to that particular figure that Pepi is interested in. This is what I would like to know.

You see, John, here is the problem that I see we have got in Florida. It is not right for us to sit here and tell the Florida industries that they have got to get out if we are going to let other sources continue on. You see what I mean? It is not fair that they be treated one way and Alabama be treated another way.

So what I have got to find out now, if Container Corporation is not any serious problem, then maybe we ought to find out where is that point that the local industries are not going to be any serious problem. But by the same token,if any amount coming out of Florida is a serious problem, then it would seem to me like any amount coming out of Alabama is a serious problem.

So what I would like to find out is to compare apples with apples. I don't know anything about total carbon, I don't know anything about TOC, BOD, QRS, anything like that. All I want to know is whether or not the point that Pepi has brought up has been covered in the studies of EPA to determine whether or not we can determine where that source is coming from in Alabama. This is what I want to find out.

MR. WHITE: Fine. Would it be suitable to you if we could get Mr. Little and Mr. deCastro together--

MR. LEVIN: Yes, sir.

MR. WHITE: --and get a report after we have our lunch break, come back and work them in?

MR. LEVIN: Yes, sir.

MR. WHITE: So I will ask that you get together with Mr. Little so that we can get into this area just a little more then.

MR. TRAINA: I have a few other questions, Mr. deCastro, based on your presentation. I think I can ask them quickly.

You mentioned in your Monsanto order the deep well situation. I am sorry, I didn't get completely what--

MR. DE CASTRO: That is the flow that requires 90 percent treatment and deep well disposal streams.

MR. TRAINA: So the company is now under order to provide 90 percent removal?

MR. DE CASTRO: That has no bearing with this conference.

MR. TRAINA: I know that, but I am asking the question.

MR. DE CASTRO: Yes, sir.

MR. TRAINA: They are under order now to remove 90 percent of--

MR. DE CASTRO: Yes, sir.

MR. TRAINA: Of what, now, BOD?

MR. DE CASTRO: Ninety percent removal of the pollutants disposed of by deep well injection.

MR. TRAINA: This is BOD, nitrogen, phosphorus--

MR. DE CASTRO: Yes, sir.

MR. TRAINA: --TOC?

MR. DE CASTRO: Yes.

MR. TRAINA: O. K. The other question, just a point of clarification, I think you addressed is Century, Florida. Of course they were made part of this conference recommendation.

MR. WHITE: I believe Mr. Lively or what is the--

MR. DE CASTRO: I mentioned--

MR. TRAINA: He reported on the other four and I just wondered if you reported on Century?

MR. DE CASTRO: I reported on Century as the sampling point, as the sampling station.

MR. WHITE: If I may interject something, we are going to get a report on that.

MR. TRAINA: I was not aware of that.

MR. MAURIELLO: Mr. Linne indicates that he can cover it in 5.

MR. WHITE: Very good, Mr. Linne.

MR. MAURIELLO: This is basically a status report of the Gulf Power facilities in the Northeast sewage treatment plant in regards to the State permit system and the action that they are taking.

W. E. LINNE, ACTING CHIEF
BUREAU OF PERMITTING
DEPARTMENT OF POLLUTION CONTROL
TALLAHASSEE, FLORIDA

MR. LINNE: Mr. Chairman, conferees, ladies and gentlemen.

I am the Acting Chief, Bureau of Permitting, Department of Pollution Control, State of Florida.

I have got two short reports to make here, one having to do with the thermal discharges to the Escambia River, and I will read what I have here. I will read the whole thing.

The scope of this report is limited to thermal discharges into the Escambia River and the possible effects of these discharges on the water quality of that river and bay.

The largest heat discharge to the river is from the

Crist Plant of the Gulf Power Company. This may be controversial. It is all right if it is. The plant location is shown in Figure 1. Also shown on Figure 1 is the location of the Monsanto Corporation Plant which makes a thermal discharge equal to 15 percent of that discharged from the Crist Plant.

The following table shows the growth by addition of generating units at the Crist Plant:

Unit 1 was built in 1945, Unit 2 in 1949, Unit 3 in 1952, Unit 4 in 1959, Unit 5 in 1961, Unit 6 in February 1970, and No. 7 is supposed to go into operation early in 1973.

Unit 7 will have its own cooling tower and make no thermal discharge to the river. Unit 6 operated with once-through cooling and thermal discharge to the river from February until December 1970. In January 1971 the cooling tower serving Unit 6 was placed in operation. Since that time, thermal discharge from the Crist Plant has been reduced to the combined flows from Unit 1 to 5 which has existed since 1961.

Intake for that combined system is from Governors Bayou very near its confluence with the river. Discharge is through a canal to a point one mile down river. This canal has a flume to carry Thompson's Bayou across the canal unperturbed. The tidal range at this point is as much as 2.5 feet. The plant discharge flow is 440 cubic feet per second.

Maximum temperature rise above intake or ambient is 17°F. with Units 1 to 5 fully loaded. Typical river flow data--this is taken up at Century gaging station--is shown at 1968 a minimum cubic feet per second of 596, maximum cubic feet per second 15,300.

In 1969 minimum cubic feet per second 993, maximum cubic feet per second 37,800, average annual 4,621.

There are, of course, additional tributary stream and spring flows below the gaging station, but these are not measured.

Thermal studies of the Escambia River at and below the Crist Plant were conducted in December 1969 and August 24 and 25, 1971, by the Department of Pollution Control Northwest Regional Office. It should be noted that the first set of data was taken prior to the operation of Unit 6 and the second study was made well after the Unit 6 discharge was removed from the river and connected to the cooling tower. Thus the same units were discharging to the river during both studies. Also river flow is typically three times greater in December than in August.

The Plant was at or near full load each afternoon in August 1971. The Department of Pollution Control study of August 24 and 25, 1971, also provided observations of dissolved oxygen and salinity.

I am going to skip part of this. You have all of it.

MR. WHITE: Well, if you are going to jump around, would you like to have the report entered in the record?

MR. LINNE: Yes, please.

MR. WHITE: You have some charts and things that will be of significance too?

MR. LINNE: Yes.

MR. WHITE: We will enter that into the record as if read.

MR. LINNE: Very good.

MR. WHITE: And if you would like to just highlight it from here on.

(The above-mentioned report follows:)

A Report on Thermal Discharges to the Escambia River
January 21, 1972

For Presentation at the Federal-State
Escambia Bay Conference
January 24-26, 1972

Introduction

The scope of this report is limited to thermal discharges into the Escambia River and the possible effects of these discharges on the water quality of that River and Bay.

The largest heat discharge to the River is from the Crist Plant of the Gulf Power Company. The Plant location is shown in Figure 1. Also shown on Figure 1 is the location of the Monsanto Corporation plant which makes a thermal discharge equal to 15% of that discharged from the Crist Plant.

FORM GD 12

GULF POWER COMPANY

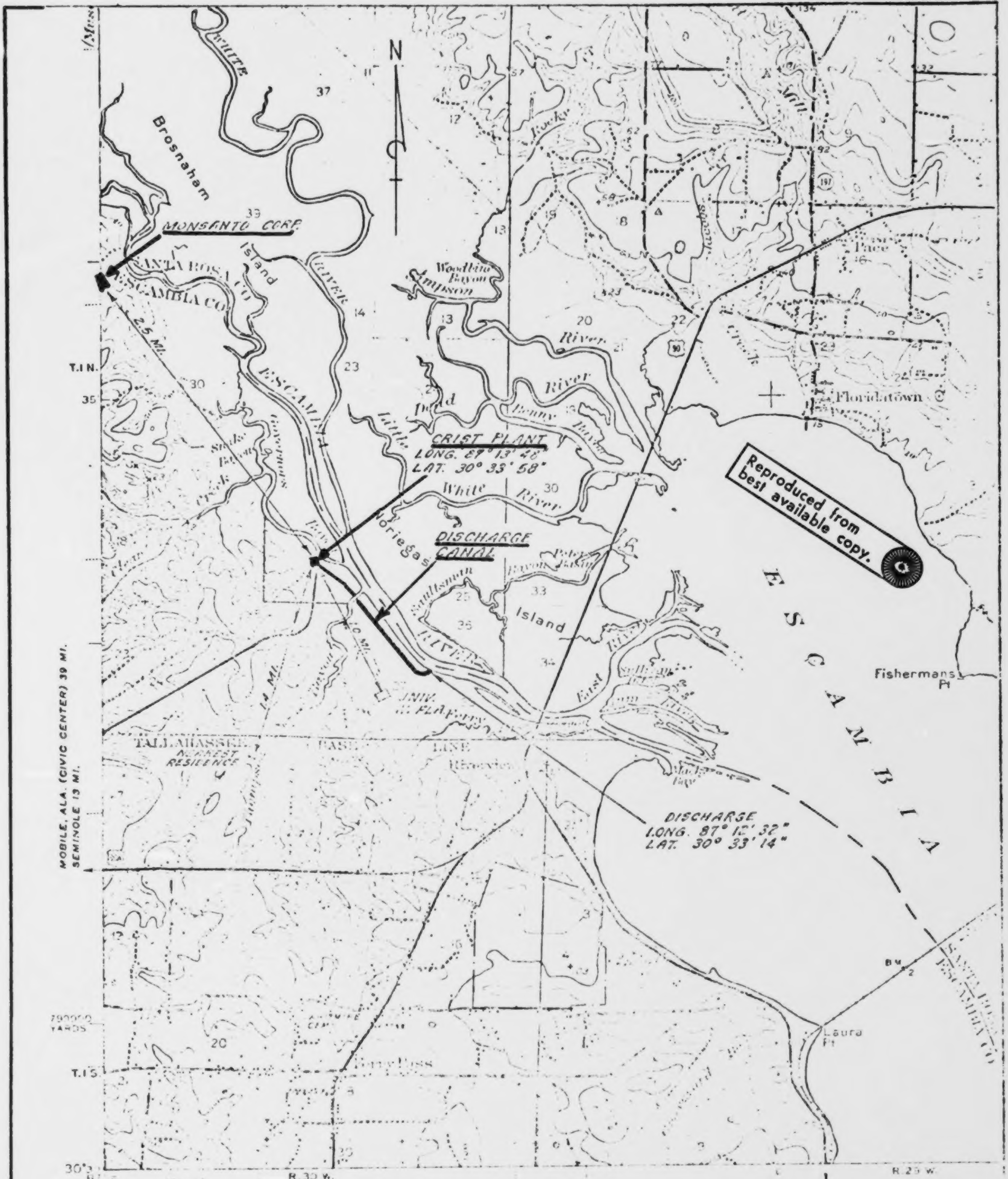


Fig. 1

DR.	SUBJECT [illegible] 5 [illegible]
TR.	DETAIL SITE LOCATION AND SURROUNDING AREA
DATE [illegible]	2
	SCALE ______ SH. 1 OF 1 SHEETS A-[illegible]

Description of Crist Plant, Gulf Power Company

The following table shows the growth by addition of generating units at the Crist Plant.

Unit	Operational Date	Nameplate Capacity, MW	Max. Temp. Rise, °F	Fuel
1	1945	24.5	12	Oil/Gas
2	1949	24.5	12	Oil/Gas
3	1952	33.0	15	Oil/Gas
4	1959	83.0	17	Coal
5	1961	83.0	17	Coal
6	Feb. '70	326.0	--	Coal
7	Early '73	500.0	--	Coal

Unit 7 will have its own cooling tower and will make no thermal discharge to the River. Unit 6 operated with once-through cooling and thermal discharge to the River from February until December, 1970. In January, 1971, the cooling tower serving Unit 6 was placed in operation. Since that time thermal discharge from the Crist Plant has been reduced to the combined flows from Unit 1 to 5 which has existed since 1961. Intake for that combined system is from Governors Bayou very near its confluence with the River. Discharge is through a canal to a point one mile down River. This canal has a flume to carry Thompsons Bayou across the canal unperturbed. The tidal range at this point is as much as 2.5 feet. The plant discharge flow is 440 cubic feet per second. (all flows in this report will be in cubic feet per second, c.f.s., for comparison with River flow). Maximum temperature rise above intake or ambient is 17°F with Units 1 to 5 fully loaded. Typical river flow data (Century, Florida gaging station 25 miles upstream) is shown below.

Year	min., c.f.s.	max., c.f.s.	annual ave. c.f.s.
1968	596	15,300	2,889
1969	993	37,800	4,621

(34 year average flow - 5,952 c.f.s.)

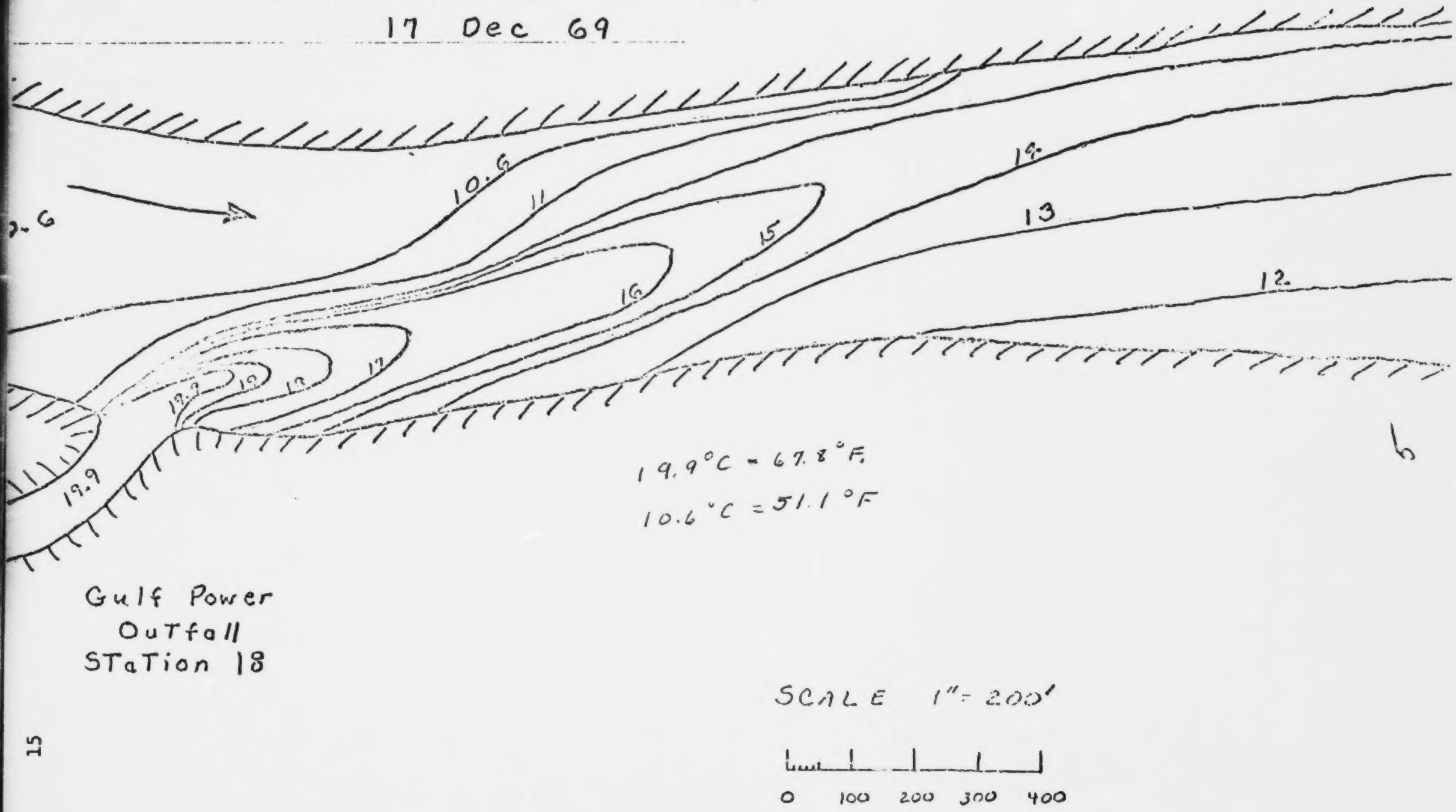
There are, of course, additional tributary stream and spring flows below the gaging station, but these are not measured.

Thermal Studies of the Escambia River

Thermal studies of the Escambia River at and below the Crist Plant were conducted in December, 1969, and August 24 & 25, 1971, by the Department of Pollution Control Northwest Regional Office. It should be noted that the first set of data was taken prior to the operation of Unit 6 and the second study was made well after the Unit 6 discharge was removed from the River and connected to the cooling tower. Thus the same units were discharging to the River during both studies. Also River flow is typically three times greater in December than in August. The Plant was at or near full load each afternoon in August, 1971. The Department of Pollution Control study of August 24 & 25, 1971, also provided observations of dissolved oxygen and salinity. The River flow on those dates was 2,670 c.f.s. Figures 2 and 3 present thermal surface contours for December 19, 1969, and August 24, 1971, respectively. The plant was fully loaded on both occasions; and, despite the extremes of season and temperature, the contours of thermal influence are very similar. An abstract of the study follows:

> On August 24 and 25, 1971, the Department of Pollution Control determined the thermal and disolved oxygen contours around the Crist Plant discharge canal in the Escambia River. A maximum temperature increase of 10.7°F. was found near the outfall with an average increase of between 3.6 an 5.4°F at the U.S. 90 bridge one mile downstream. Stratification of the salt

THERMAL SURFACE CONTOURS (°C)
at
Gulf Power Outfall
17 Dec 69

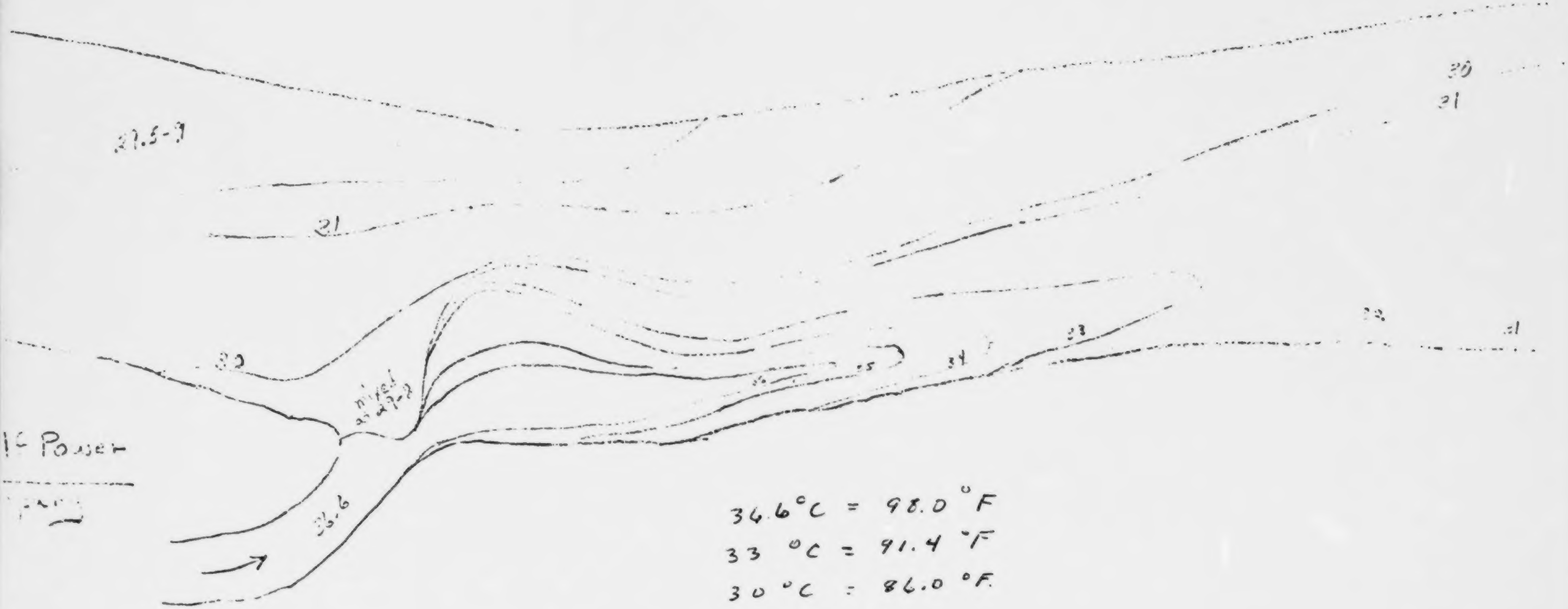


19.9°C = 67.8°F
10.6°C = 51.1°F

SCALE 1" = 200'

Fig. 2

Thermal Contours, Surface
August 24, 1971 — °C.



34.6°C = 98.0°F
33 °C = 91.4 °F
30 °C = 86.0 °F.

Fig. 3

> wedge was noted. Low D. O. values and high salinity were measured below the 10 foot depth. Generally low D.O. values exist around the outfall, but recovery of normal D.O. had taken place by the time the water had reach the U.S. 90 bridge.

Gulf Power has provided thermal study data for studies of June 24, 1969, (before Unit 6 operation), May 27, 1970, (Units 1 to 6 discharging to River) and June 9 and August 30, 1971, (Unit 6 on cooling tower). The results were very similar in comparable cases.

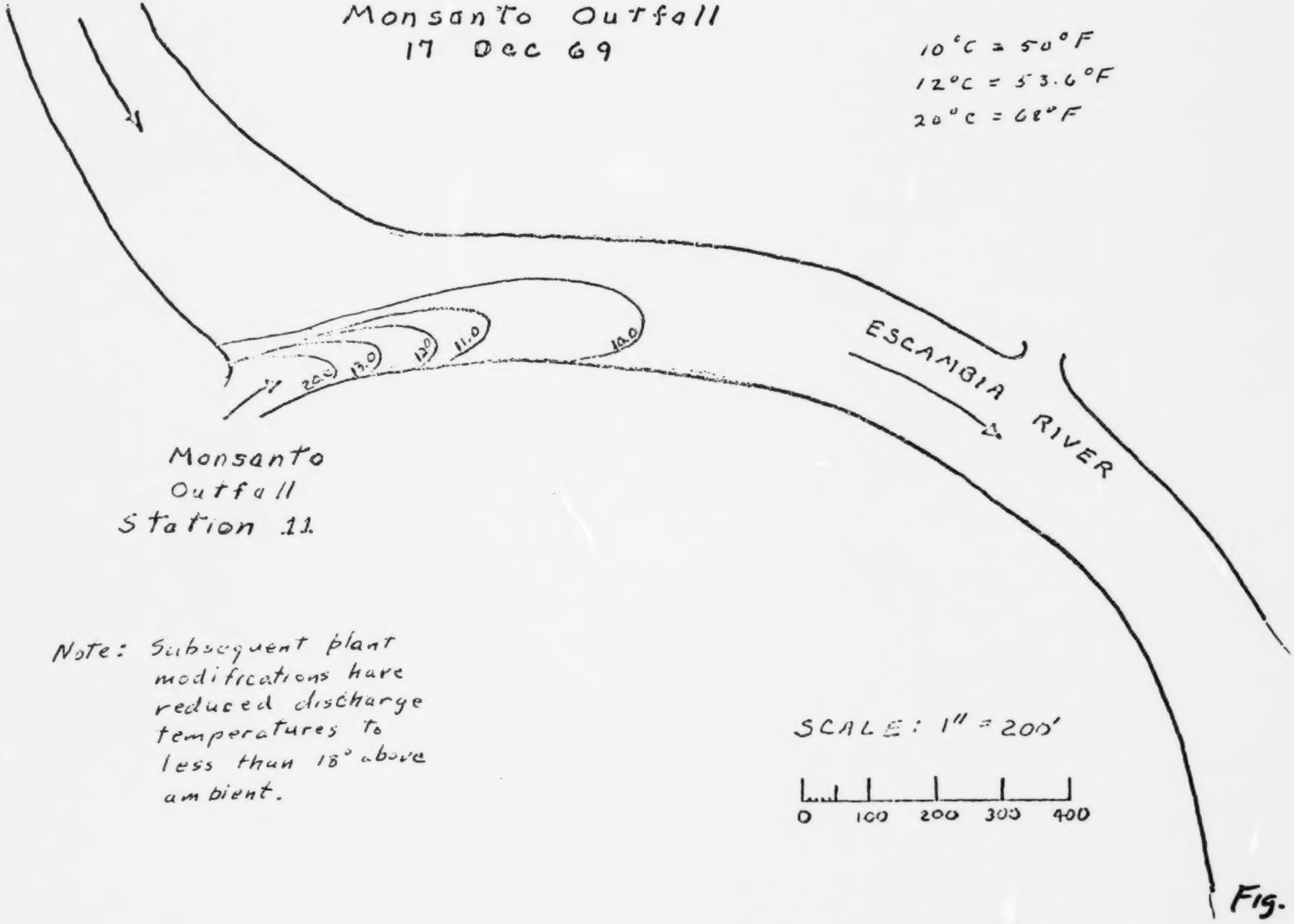
Monsanto Corporation Discharge

The Monsanto Plant makes a thermal discharge from a second stage of the Plant chilled water system which is used for process cooling and air conditioning. The discharge temperature now remains fairly constant throughout the year at 14-18°F above intake or ambient water temperature. Thermal contours are shown on Figure 4. The seasonal variation in heat load is handled by varying the flow from about 40 c.f.s. in winter to 65 c.f.s. in the summer. The thermal discharge plume in the River stays in the upper few feet of water and clings to the right or west bank of the River. The plume does not extend across the River beyond mid-channel. The plume is mixed and dissipated within 300 yards of the mouth of the discharge canal.

Description of the Escambia River

The most conspicuous feature of the River is the underlying salt water wedge or tongue which extends up river beyond the Monsanto Plant during periods of low river flow. It is present at the Crist Plant during normal river flow during most of the year.

THERMAL SURFACE CONTOURS (°C)
at
Monsanto Outfall
17 Dec 69



Note: Subsequent plant
modifications have
reduced discharge
temperatures to
less than 18° above
ambient.

Fig. 4

It is probably washed out during annual high river flows although no observation has been made at flood stage to substantiate this. The salt wedge appears to be stagnant, when present, and has a dissolved oxygen content less than 2ppm.

The reach of the River under consideration is thus alternately fresh water or estuarine in character. For much of the year the bottom biota environment is marine in character but quite unfavorable due to dissolved oxygen deficiency. Tidal effects bring fresh water in and out of the marshes to the fresh, surface layer. The summertime solar heating of these marshes imposes a natural heat load on the River. This River heat load is, however, dominated by solar heat input to Escambia Bay when considering conditions in the Bay. The summer temperature of the salt wedge in the River is typically one or two degrees Fahrenheit higher than the overlying flowing fresh water. That heat had its origin in the Bay.

Discussion of Thermal Additions to the River

The Monsanto discharge has a small zone of influence on the River. Heat dissipation by mixing is rapid and biological damage outside the small mixing zone is negligible. The thermal load is completely dissipated long before it reached the Crist Plant and is not additive to the discharge of the Crist Plant.

The biotic index of the River from the Crist Plant to the mouth is depressed. The Plant heat load to the River is now (and has been since January 1971) the same as has existed for he period 1961-1969. It cannot be stated that the Plant load to the River is entirely responsible for the biotic index depression below the Plant. The Plant heat load is additive to the natural heat additions.

At the U. S. 90 bridge near the mouth of the River surface water temperatures are increased by 3 to 6°F by the Plant heat load. This heat load is discharged to the Bay but is rapidly dissipated by mixing and natural cooling near the River mouth. No heat balance calculations have been attempted for the Bay, but it is considered that natural heating and cooling of that large body of water will dominate any effects of the Plant thermal addition to the Bay. Acute adverse water quality and its severe effect on the biota occur at some distance from the mouth of the River. In the absence of thermal studies in the immediate vicinity of the River mouth, it cannot be determined what effect, if any, the Plant thermal load has on the Bay. If thermal additions do extend to areas of acute Bay degradation, they will be small, but they can aggravate the effects of other, much more important, factors that are degrading water quality.

Conclusions and Recommendations

1. The Monsanto Plant discharge makes no significant thermal addition to Escambia Bay.
The thermal addition to the River causes no measurable biological degradation beyond the small mixing zone. If it is required to remove the heat load from the River, a pond (or series of ponds) with 16 hours detention time, an estimated 40 acres of water surface area, and flow control is a feasible means of removing this heat load to the River.

2. It cannot be determined that the Crist Plant discharge is entirely responsible for depression of biotic index of the River below the Plant. The Plant heat load that reaches the Bay has not been compared to natural heat loads in areas of acute biological

damage to the Bay. If it is required to remove this heat load from the River and Bay, cooling towers at an estimated cost of \$3 million would be required. Topography precludes cooling ponds. In view of the indeterminate effect of thermal additions to the Bay, cooling of present Plant discharges should not be required until thermal studies of Bay in the vicinity of the River mouth have been made.

W. E. Linne

MR. LINNE: I will go on to Monsanto. We have back in here--I am going to skip more of it. I am going to get over to page 9.

The Monsanto discharge has a small zone of influence on the river. Heat dissipation by mixing is rapid and biological damage outside the small mixing zone is negligible. The thermal load is completely dissipated long before it reached the Crist Plant and is not additive to the discharge of the Crist Plant.

The biotic index of the river from the Crist Plant to the mouth is depressed. The plant heat load to the river is now, and has been since January 1971, the same as has existed for the period 1961 through 1969. It cannot be stated that the plant load to the river is entirely responsible for the biotic index depression below the plant. The biotic index above the plant is about 24 and below the plant it cuts down to about 12. The plant heat load is additive to the natural heat addition.

At the U.S. 90 Bridge near the mouth of the river surface water temperatures are increased by three to four degrees Fahrenheit by the plant heat load. This is discharged to the bay but is rapidly dissipated by mixing and natural cooling near the river mouth. No heat balance calculations have been attempted for the bay, but it is considered that

W. E. Linne

natural heating and cooling of that large body of water will dominate any effects of the plant thermal additions to the bay. Acute adverse water quality and its severe effect on the biota occur at some distance from the mouth of the river. In the absence of thermal studies in the immediate vicinity of the river mouth it cannot be determined what effect, if any, the plant thermal load has on the bay. If thermal additions do extend to areas of acute bay degradation, they will be small but they can aggravate the effects of other much more important factors that are degrading water quality.

This is getting around to conclusions and recommedations.

1. The Monsanto Plant discharge makes no significant thermal addition to Escambia Bay. The thermal addition to the river causes no measurable biological degradation beyond the small mixing zone. If it is required to remove the heat load from the river, a pond or series of ponds with 16 hours detention time, an estimated 40 acres of water surface area, and flow control is a feasible means of removing this heat load to the river.

I would say our thermal standards for the State are not yet established but will be shortly and it will be determined when we have those as to whether or not this plant complies with the State standards.

2. It cannot be determined that the Crist Plant discharge is entirely responsible for depression of biotic index of the river below the plant. The plant heat load that reaches the bay has not been compared to natural heat loads in areas of acute biological damage to the bay. If it is required to move this heat load from the river and bay, cooling towers at an estimated cost of $3 million would be required. Topography precludes cooling ponds. In view of the indeterminate effect of thermal additions to the bay, cooling of present plant discharges should not be required until thermal studies of bay in the vicinity of the river mouth have been made.

That concludes this.

MR. WHITE: Thank you, Mr. Linne.

Comments or questions?

MR. RAVAN: I have a question.

I would like for you to run through one more time why you say it cannot be determined that the Crist Plant discharge is entirely responsible for that depression.

MR. LINNE: There has not been enough investigative work done there to determine that. If we are going to find this out, there is a lot more work needed there.

MR. RAVAN: O. K., thank you.

MR. MAURIELLO: I might interject, Mr. Ravan, also, that this is right in the salt tongue area, right where the fresh and salt water mixing zone is, which has an effect.

MR. LEVIN: Excuse me, Mr. Chairman.

MR. WHITE: Go ahead.

MR. LEVIN: I did understand you to say that Gulf Power is discharging 17 degrees above ambient?

MR. LINNE: That is correct.

MR. LEVIN: What is the proposed thermal standard of the State of Florida? Do you know?

MR. LINNE: In an area--I--

MR. MAURIELLO: No, sir.

MR. TRAINA: I might comment that--

MR. LINNE: Let me finish. I can't answer that exactly. I am pretty well aware what was presented. I don't know how it has come out.

MR. LEVIN: It is certainly nowhere near 17 degrees?

MR. LINNE: No, sir, it is not.

MR. LEVIN: So they had better get ready?

MR. LINNE: I would assume so.

MR. LEVIN: O. K.

MR. TRAINA: May I just say that nationally a figure of 5 degrees has been discussed as a national thing. Of course this is adjusted, but 5 degrees is a maximum rise that has been discussed.

MR. LEVIN: I think ours is somewnere around 4 to 4 . 5 is what Florida is going to adopt eventually, I believe.

MR. LINNE: There is another little--may I add to that? In our thermal proposals I don't know whether we have eliminated the mixing zone or not. I am not sure of that.

Yes, sir.

MR. TRAINA: The report of the State agency which you abstracted here states that there is an increase of 10.7 degrees was found near the outfall with an average increase of between 36 to 54 at Highway 90 Bridge. The question is, was the flow regime there representative of summer condition? Is this a high value or a low value? Do you have any feel for this? Maybe Mr. Mauriello could respond to this.

MR. MAURIELLO: I think the data when it was taken was in August.

MR. LINNE: Which would be--let's see--would be high, if I remember. If you look back in last year's publication of this meeting you will find that the figure--there are many figures in there that have most of that outlined.

MR. TRAINA: Also in your presentation I believe you stated at Highway 90 Bridge near the mouth, this is on page 10, water temperatures increased by three to four degrees. I think that is what you said in your presentation.

MR. LINNE: It is in there.

MR. TRAINA: However your report indicates three to six degrees.

MR. LINNE: What is your question, please?

MR. TRAINA: Is it six degrees? I believe it reads six degrees. In your verbal presentation you said three to four.

MR. LINNE: Whatever is in here is correct.

MR. TRAINA: O. K.

MR. MAURIELLO: Three to six.

MR. TRAINA: O. K., thank you.

MR. WHITE: Any other comments or questions?

MR. LINNE: I have one more.

MR. WHITE: Proceed, Mr. Linne.

MR. LINNE: This one has to do with the report on the status of the city of Pensacola Northeast sewage treatment plant.

MR. WHITE: Well, I thought maybe you had one more comment.

MR. LINNE: No, sir.

MR. WHITE: Let's go off the record a minute.

(Off the record.)

MR. WHITE: Let's go back on the record.

If you would be agreeable, Mr. Linne, to make a presentation right after lunch?

MR. LINNE: Like the man said, as you would have it.

MR. WHITE: Fine. We stand recessed until 2 p.m.

(NOON RECESS)

AFTERNOON SESSION

MONDAY, JANAURY 24, 1972

(2 o'clock)

MR. WHITE: Let's go back in session, please.

When we left, I believe we were in the middle of Mr. Linne's testimony. And if you would, step forward and just proceed with the report that you were making on Pensacola.

MR. LINNE: Thank you.

MR. WHITE: And I would like to say, though, that I assume we will call Mr. deCastro back after you finish your presentation for some further questions.

MR. LINNE: This report on the status of city of Pensacola Northeast sewage treatment plant.

The first session of the State-Federal Enforcement Conference held in Gulf Breeze, Florida, on January 21-22, 1970, recommended that there shall be reductions of 94 percent carbonaceous, 94 percent nitrogenous, and 90 percent phosphorus wastes discharged by the Northeast sewage treatment plant of the city of Pensacola.

As a result of this recommendation, the city of Pensacola submitted a report in January of 1971 covering the results of laboratory studies on the feasibility of removing phosphorus from the plant's effluents. These studies demonstrated that soluble phosphate residuals approaching zero can be obtained by adding the coagulant (aluminum sulfate or sodium aluminate) directly into the feed to the activated sludge tank. However, minimum phosphate levels and higher effluent quality were obtained only after further clarification of the secondary effluents by filtration. The cost for chemicals (commercial alum) alone were estimated to be $55 to $60 a day.

Removal of nitrogen was also found to be improved by the above treatment for phosphorus removal. However, this process cannot provide a high degree of removal required by the enforcement conference.

Meanwhile, the city of Pensacola accepted and approved the 5-year sewer plan for metropolitan Pensacola developed on behalf of the Escambia-Santa Rosa Regional Planning Council. This plan recommended the abandonment of the Northeast plant and diversion of sewage from its service area to the Main Street plant for the treatment and discharge to Pensacola Bay.

In its report dated August 12, 1971, to the Department the city proposed modification to the existing plant in order to upgrade the quality of treatment to accommodate the new standards. This alternative, the city contended, would entail keeping the existing plant in service for an interim number of years by providing advanced treatment and would meet the December 31, 1972, deadline imposed by the enforcement conference. The city cited the problems and difficulties involved in the abandonment of the existing plant before December 31, 1972, as the reason for maintaining and upgrading the existing plant.

The Department has accepted the proposal of the city for advanced treatment as an interim measure before the plant is abandoned and the effluent diverted to the Main Street plant. A temporary operating permit, valid until June 1, 1972, was issued to the plant on December 31, 1971, with the following conditions among others:

1) Before April 1, 1972--Consistent removal of no less than 94 percent 5-day BOD and suspended solids, 94 percent total nitrogen and 90 percent total phosphorus removal before discharge to area surface waters shall be obtained.

2) Before May 1, 1972--Results on effluent quality and other (operational) data should be submitted.

3) Before May 1, 1972--Advise the Department of Pollution Control as to when this plant will conform to the concept of the 5-year master plan for the city of Pensacola, i.e. connection to an areawide system.

4) Provide standby power for operation

W. E. Linne

of the treatment plant and chlorination facilities.

5) Provide dual chlorination facilities for adequate and continuous disinfection of the effluent.

6) Effective January 15, 1972, no additional connection to the existing collection system shall be made without the prior approval of the Department of Pollution Control.

The Department has been notified by the City that the installation of chemical feed equipment has already been completed and other improvements are under way.

Summary and conclusions:

The Northeast sewage treatment plant of the city of Pensacola was required by the first State-Federal Enforcement Conference to upgrade the level of treatment in order to achieve reductions of 94 percent carbon, 94 percent nitrogen and 90 percent phosphorus wastes no later than December 31, 1972.

The city conducted laboratory studies on removal of nutrients and found that it was feasible to remove soluble phosphate down to zero levels by employing alum coagulation. Some degree of nitrogen removal was also claimed for this process.

Meanwhile, the city has also adopted the metropolitan Pensacola 5-year sewer plan which recommended abandonment of the existing plant and pumping the sewage to the Main Street plant for discharge to Pensacola. Since the actual implementation of this proposal cannot be accomplished before December 31, 1972, the city has decided to upgrade the quality of the effluents presently being discharged to Escambia Bay in order to comply with the requirements of the enforcement conference.

The Department of Pollution Control has required the city to submit by May 1, 1972, evidence showing compliance with the requirements of the enforcement conference.

A temporary operating permit issued by the Department to the existing plant will expire on June 1, 1972. As a condition of the permit, the city has been required not to allow additional connections to the sewer system served by the plant.

That is it. Thank you.

(The following documents were attached to Mr. Linne's statement:)

APPENDIX

CITY OF PENSACOLA, NORTHEAST SEWAGE TREATMENT PLANT

DESCRIPTION OF THE EXISTING FACILITIES

(Data taken from City's Application for Operation Permit dated 3/3/71)

1. Treatment Units

Grit Chamber
Primary Clarifier
Trickling Filter
Secondary Clarifier
Chlorine Contact Chamber
Anaerobic Digester

2. Flow Data

	Ave.	Max.	Design
Daily Flow, GPD	500,000	700,000	850,000

3. Waste Characteristics

Parameter	Influent	Effluent	Removal Efficiency (Per Cent)
BOD_5	151	33	78
Diss. Solids:			
Volatile	155	98	36
Fixed	148	129	12
Susp. Solids			
Volatile	64	32	50
Fixed	91	32	64
NH_3-N	7.85	6.39	18
(NO_2+NO_3)-N	0.182	0.373	—
TOTAL PO_4	56.2	31.5	43

4. Sludge Disposal

Digested sludge is being used as landfill.

STATE OF FLORIDA
DEPARTMENT OF POLLUTION CONTROL
SUITE 300, TALLAHASSEE BANK BUILDING
315 SOUTH CALHOUN STREET, TALLAHASSEE, FLORIDA 32301

VINCENT D. PATTON
EXECUTIVE DIRECTOR

DAVID H. LEVIN
CHAIRMAN

January 12, 1972

Escambia County-DW
City of Pensacola
Northeast STP--TOP

Please Reply to:

Department of Pollution Control
Northwest Regional Office
Mr. Phil Doherty, Regional Engineer
1304 Shoreline Drive
Gulf Breeze, Florida 32561
Phone: 904/932-5323

Mr. Frank Faison
City Manager
City of Pensacola
P. O. Box 1471
Pensacola, Florida

Dear Mr. Faison:

Pursuant to your recent application, please find enclosed a temporary permit (No. DT 17-1361) dated 12/31/71 to operate the subject water pollution source (domestic or municipal wastewaters).

This permit will expire on 6/1/72 and is subject to the conditions and requirements checked or indicated otherwise in the attached sheets entitled "Temporary Operation Permit Conditions" and "Permit Application Deficiencies."

This permit is issued under the authority of Florida Statute 403.061 (16). The time limits imposed herein are a condition to this permit and are enforceable under Florida Statute 403.161 (1)(b). You are hereby placed on Notice that the Department will review this permit before the scheduled date of expiry and will seek court action for violation of the conditions and requirements of this permit.

You have ten days from the date of receipt hereof within which to seek a review of the conditions and requirements contained in this permit.

Your continued cooperation in this matter is appreciated and in future communication please refer to your permit number.

Very truly yours,

W. E. Linne

W. E. Linne, Acting Chief
Bureau of Permitting

WEL:tns
cc: Mr. Ralph H. Baker, Jr.
Mr. Phil Doherty
Mr. Wayne E. Tisdale
Mr. Joseph A. Mandy
Mr. J. F. de Castro

JOHN R. MIDDLEMAS
BOARD MEMBER

GEORGE RUPPEL
BOARD MEMBER

JAMES F. REDFORD, JR.
BOARD MEMBER

A. D. VINCENT
BOARD MEMBER

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STATE OF FLORIDA
DEPARTMENT OF AIR AND WATER POLLUTION CONTROL

TEMPORARY OPERATION PERMIT

FOR City of Pensacola
P. O. Box 1471
Pensacola, Florida

PERMIT NO. DT 17-1361 DATE 12/31/71

PURSUANT TO THE PROVISION OF SECTION 403.061 (16) OF CHAPTER 403, FLORIDA STATUTES AND CHAPTER 17-4 FLORIDA ADMINISTRATIVE CODE, THIS PERMIT IS ISSUED TO:
Mr. Frank Faison, City Manager

FOR THE TEMPORARY OPERATION OF THE FOLLOWING:
0.85 MGD (design) Trickling Filter Plant with 77 per cent 5-day BOD removal

LOCATED AT: Vicinity of Scenic Highway & Langley Avenue, Pensacola, Escambia County

IN ACCORDANCE WITH THE APPLICATION DATED 3/31/71 FILED WITH THE DEPARTMENT AND SUBJECT TO THE CONDITIONS APPENDED HERETO, ALL OF WHICH ARE CONSIDERED A PART OF THIS PERMIT.

THIS PERMIT SHALL BE EFFECTIVE FROM THE DATE OF ITS ISSUANCE UNTIL 6/1/72, AND SUBJECT TO ALL APPLICABLE LAWS OF THE STATE AND RULES AND REGULATIONS OF THE DEPARTMENT.

W. E. Linne
W. E. Linne, Acting Chief
~~[illegible]~~
BUREAU OF PERMITTING

Vincent D Patton
VINCENT D. PATTON
EXECUTIVE DIRECTOR

FORM 1-11

STATE OF FLORIDA

DEPARTMENT OF POLLUTION CONTROL

PERMIT APPLICATION DEFICIENCIES

Permit No.: DT 17-1361 **Date:** 12/31/71

☒ 1. Identify the location of pollution control plant by street address, and latitude and longitude, or Universal Transverse Mercator (UTM) grid system to the nearest 100 meters.

☐ 2. Furnish details of prior approvals or permits (number and date).

☐ 3. Have all applications signed by a professional engineer registered in Florida. Three Copies of the application are returned herewith.

☐ 4. Owner or authorized agent failed to sign the statement on Page 2A. Attach letter of authorization if applicable.

☒ 5. Name and title of the owner or authorized agent are either not given or not legible. Furnish this information.

☒ 6. Submit a USGS map or map section or a sketch or plot plan in quadruplicate. (The scale of the map provided is not sufficient to identify the location accurately)

☒ 7. Information relating to the following items is either missing or insufficient:

Page	Item	Additional Remarks
6 B	III C	
7 B	IV B2	Identify the drainage path of effluents
8 B	IV C6	Plan and profile of outfall
10B	V A3	Location of landfill
		Submit the missing information noted in this sheet before Feb. 15, 1972.

INDICATE ZIP CODE ON ALL ADDRESSES

STATE OF FLORIDA

DEPARTMENT OF POLLUTION CONTROL (DPC)

TEMPORARY OPERATION PERMIT CONDITIONS

DOMESTIC (MUNICIPAL) WASTE SOURCES

Permit No.: DT 17-1361 DATE: 12/31/71

1. The existing level of treatment is not in compliance with Section 17-3.04 Florida Administrative Code.

   Consistent removals of no less than 94 per cent 5-day BOD and suspended solids, 94 per cent total nitrogen and 90 per cent total phosphorus before discharge to area surface waters shall be obtained.

   An application for construction permit shall be filed with the DPC before beginning upgrading/replacement of the existing plant.

   The following schedule for compliance with the above requirements shall be adopted in accordance with the proposal submitted by the City on August 12, 1971 and the progress achieved to date in implementing the proposal:

   a) Completion of upgrading as required by this permit: April 1, 1972.

   b) Results on effluent quality and other required data to be submitted to DPC: Prior to May 1, 1972.

   c) This temporary permit will expire on: June 1, 1972.

2. Provide standby power for operation of the treatment plant and chlorination facilities.

3. Provide dual chlorination facilities for adequate and continuous disinfection of the effluent.

4. No wastewater shall be allowed to deliberately bypass the existing pollution control facility without the prior approval of the DPC.

5. Submit a copy of industrial waste ordinance now in effect in order to protect the treatment facilities from toxic wastes and/or organic and hydraulic shock loadings.

6. When an areawide (regional/metropolitan) collection and treatment system becomes available, the DPC may require the permittee to connect the source to such a system within a specified period of time. It will be incumbent upon the permittee to comply with such requirement and cease operation of the permitted source.

7. During the period of temporary operation allowed by this permit, the applicant (owner) shall furnish two copies of monthly reports on the operation of the pollution control plant. Such reports shall also contain information on the daily quantities of waste sludge generated at the source, type and degree of its treatment and the site of its ultimate disposal.

   Reports for a month shall be submitted to the Regional Office of this Department no later than the fifteenth day of the succeeding month.

8. Effective January 15, 1972 no additional connection to the existing collection system shall be made without the prior approval of the DPC.

9. By May 1, 1972 you should advise us as to when this plant will conform to the concept of the Five-Year Master Plan for the City of Pensacola i.e. connection to an areawide system, as mentioned in item #6.

Please Reply to:

Department of Pollution Control
Northwest Regional Office
Mr. Phil Doherty, Regional Engineer
1384 Shoreline Drive
Gulf Breeze, Florida 32561
Phone: 904/932-5323

MR. WHITE: Thank you, Mr. Linne.

Any comments or questions?

MR. TRAINA: Mr. Linne, do you know what the loads will look like coming from the Pensacola plant during this interim period? Do you have those figures? In your permit did you establish loads or percent removals?

MR. LINNE: That was percent removal by--let me find out here.

I don't have it in this portion. I don't have it.

MR. TRAINA: During the first sesssion of the conference there was some reference made to--

MR. LINNE: What you are talking about is the interim?

MR. TRAINA: Yes. There were some loads referred to, though, that were set for the city of Pensacola.

MR. LINNE: What they are hoping to achieve. Let's see here, see if I can find it.

I don't have it in this part.

MR. TRAINA: Well, maybe you could submit that for the record.

MR. LINNE: I think we can find it.

MR. TRAINA: Mr. Chairman, I don't have any questions about Pensacola, but is Mr. Linne going to speak to the question of Century?

MR. WHITE: I plan to ask Mr. Mauriello who would be the proper party to speak to the Century problem.

MR. MAURIELLO: We have Mr. Tennant from the County Health Department here and also the Regional Engineer I think has some information on it. Do you want to go into it now to get it out of the way?

MR. WHITE: Well, this concludes the Department's technical presentation but for that, is that correct?

MR. MAURIELLO: Right.

MR. WHITE: I would like to proceed with that now, if you are ready.

MR. MAURIELLO: O. K.

MR. LINNE: Thank you.

MR. MAURIELLO: We have asked Mr. Tennant from the County Health Department to give us a brief status report on the Century situation.

B. G. TENNANT
COUNTY HEALTH DEPARTMENT
PENSACOLA, FLORIDA

MR. TENNANT: Gentlemen, let me first say that I have no authority as far as the operation of this system or the approval of the system. I am merely going to advise you as to what the status is.

Prior to the installation of the temporary system now existing in Century, which serves the Century Hospital, the Century Mill, and approximately 50 houses, the raw sewage discharged went into a stream area that finally found its way into Escambia River. At the time of the construction of the Century Hospital a system was to be installed at the site of the new Century Hospital which would have discharged into an old line that was installed many years ago, which is the system in operation now.

A temporary system has been installed and is in operation for the Century Mill, the approximately 50 houses and the hospital. The system consists of a large septic tank, a biological pond and chlorination of the final effluent.

It is my understanding too that a move is under way whereby a report will be made on the development of an overall system to serve the Century-South Flomaton area.

MR. TRAINA: Will this report talk about a regional system, a collection and treatment system?

MR. TENNANT: It is my understanding that this report would cover the urban area of Century-South Flomaton, yes, which is being prepared by Justice and Associates.

MR. TRAINA: Do you have a date as to when that report will be forthcoming and what it--

MR. TENNANT: No, sir.

MR. TRAINA: --might recommend in the terms of an implementation plan for a treatment facility?

MR. TENNANT: No, sir, I do not.

MR. TRAINA: May I ask, does the State of Florida have Century under some sort of orders?

MR. MAURIELLO: No, it is not right now. It is under a temporary operating permit, Mr. Traina, the intent being that they have the interim type facility, and granted, it does not meet the requirements of 90 percent removal, but we did know that there had been an engineer retained to do a regional type evaluation of this Flomaton-Century area or South Flomaton, and the date of that--the permit is in process right now and this is one of the domestic waste situations that we are trying to get caught up on.

MR. TRAINA: Will they be able to make the 1973 date?

MR. MAURIELLO: I would certainly think so. The type of system that we are talking about in the area that we are talking about, the volumes up there, will probably meet it. I don't see where there will be any problem. I think we will be swatting at gnats and letting the elephants run by if--

The Century situation is not as grave as it should be; I mean there are other things that are more important.

MR. WHITE: Well, we understand, but I mean we do need to carry forth with this.

MR. MAURIELLO: O. K. I think that we can get and probably enter this into the record the date of the comprehensive plan and the system for the entire area, and I will make sure that it gets into the record.

MR. TRAINA: I think this is germane.

MR. WHITE: If possible, can we get that within 30 days?

MR. MAURIELLO: Yes.

MR. WHITE: And we will include it in this record.

Any other comments or questions?

MR. LEVIN: Billy, maybe I missed this, but what are they doing now? What's happening now? Is there any treatment at all to the--

MR. TENNANT: Oh, yes, there is treatment in the temporary system, because prior to the installation of the temporary system all of it was raw sewage discharge, and of course with the installation of the temporary system, pending the development of an overall plan to serve this area, you have a holding tank with a biological pond and chlorination of the final effluent, which is much, much better than, of

NOTE:

Comprehensive plan (see p. 257) submitted to Florida Department of Pollution Control May 15, 1972.

course, discharging raw sewage. And of course the hospital, approximately 50 houses and the mill are now on this temporary system.

The system was approved as a temporary system by the Division of Health and we felt--I mean the Division of Health felt, because as I said before, gentlemen, I have no approval authority in this matter, I am speaking as to what the conditions are up there--that this was the proper step to take under the conditions until they were able to develop a plan for the overall sewering of the Century-South Flomaton area.

MR. TRAINA: What is the population involved in the Century-South Flomaton area?

MR. TENNANT: I would say about 2,500 people.

MR. TRAINA: Will the system that is going to be designed serve the entire 2,500 people?

MR. TENNANT: I hope it will. I am not familiar with that much of Mr. Justice's work, but I am assuming that it will cover the urban area of Century-South Flomaton.

MR. TRAINA: And this will be a 90 percent--I guess according to requirements under Florida law it will be a 90 percent removal facility, conventional secondary treatment?

MR. TENNANT: I would assume that that would be so, yes, sir.

MR. WHITE: Other comments or questions?

If not, thank you very much.

Let's go off the record just a minute.

(Off the record.)

MR. WHITE: Let's go back on the record, please.

MR. MAURIELLO: I would like to ask Dr. Livingston, Associate Professor from Florida State University, and I think he is also going to include Professor Hopkins.

Is he going to be involved, Doctor?

DR. LIVINGSTON: Yes, he will speak after me.

MR. MAURIELLO: This is a status report on the Department of Transportation project in Mulat Bayou.

DR. LIVINGSTON: I would like to just drag this out for you, if I may, so you can see what I am talking about.

DR. ROBERT LIVINGSTON
ASSISTANT PROFESSOR
DEPARTMENT OF BIOLOGICAL SCIENCE
FLORIDA STATE UNIVERSITY
TALLAHASSEE, FLORIDA

DR. LIVINGSTON: My name is Robert Livingston. I am an Assistant Professor at the Florida State University in the Department of Biological Science. We were commissioned by the

Department of Transportation to do a study on the Mulatto Bayou area. I have a picture right here, an aerial photograph, of the area.

The purpose of this study was to determine the effects of the dredging operations that the Department of Transportation undertook in the bayou over a certain period of time on the various deteriorating levels of the various water quality in the bayou and on the fish kills itself.

If I might simply mention, this is a--these are depths. I might go away a minute from the mike. They opened up the area here (indicating) and they borrowed fill from this area here (indicating). They also had some maintenance dredging going in this particular area here (indicating) and our particular charge in this study was to determine just how this particular dredging operation affected the water quality in that area.

MR. LEVIN: Would you show which way is north and south?

DR. LIVINGSTON: Yes. North is this way (indicating), I believe.

Well, I can show you how this bayou sits. I have torn my top sheet off.

It sits just like this (indicating) with north going in, let's see, I believe it is this direction (indicating). We are looking at this bayou here from this direction (indicating) in this particular photograph.

MR. LEVIN: Now, this is the Pensacola side, then, down here?

DR. LIVINGSTON: This is Escambia Bay right here (indicating). This (indicating) is Escambia Bay, this (indicating) is I-10, this (indicating) is the railroad, this (indicating) is Mulat Bayou, this (indicating) is Mulatto Bayou.

MR. LEVIN: I see. O. K.

DR. LIVINGSTON: We decided to break this up into various portions. First we were going to monitor over a period of time, that is over a year's period of time, the physical and chemical changes in the area. We included in this dissolved oxygen, temperature, salinity, BOD, H_2S, certain nutrients.

Also we were to do aerial photography of the area to determine the currents to see how the current changes possibly would affect all these parameters.

We also were going to do primary productivity in this area, the migrating crustaceans and the fin fishes in the area.

And finally we were to analyze exactly how all of this fit together in possible fish kills that would occur during the study period.

Dr. R. Livingston

Now, we were able to do all this, it is a big order, simply because this is a very small area and we were able to set up a large number of stations.

Dr. Hopkins will address his part of this project after I get through speaking. He was in charge of primarily the biological end of it, doing the primary productivity, the fishes and crustaceans, and the effects of this dredging and of the general area on the biological end. My end and Florida State's end was the physical and chemical parameters.

Now, if I may, we established approximately 20 stations in this study area from Florida State and our modus operandi was very simple. Once a week from July to October we would come in for a 24-hour period and over the 24-hour period, once every three hours, each of these 20-odd stations was studied for dissolved oxygen, salinity, temperature, H_2S, color, turbidity, and every other week we would do BOD's and occasionally nitrates and phosphates for nutrients. The reason for this was to get a comprehensive daily idea of exactly what was going on over the 24-hour dieoff period in order to determine perhaps the worsening conditions that would occur with time.

Now, we did vertical profiles at each station so we would have a vertical profile of each of those parameters that

I am talking about, and we complimented this study with dye studies. Using aerial photography, we were able to drop dye in the area and study the current patterns on the incoming and the outgoing currents. Dr. Hopkins and myself collaborated on this together with the Department of Transportation, who provide the plant and all the equipment, and we got a very good idea of exactly what the current pattern was in this particular area.

We were I wouldn't say lucky enough, but we happened to be there during several major fish kills and we were, therefore, very fortunate to get data during weeks prior to and after these major fish kills in a very detailed way. As you can see, these stations just cover that bayou, so we have a very excellent idea over a 24-hour period of just about everything that is going on in that bayou. We also made detailed fish observations on this area before, during and after the fish kills.

The major fish kills occurred while we were there in this area here (indicating) and this area here (indicating). This area (indicating), I might add, has been dredged for I believe it is the Escambia Shores Development and those are canals that are artifically dredged and have been dredged in that area.

Now, I must--

MR. WHITE: Could I interrupt just a minute here?

DR. LIVINGSTON: Surely.

MR. WHITE: Do you have any small drawings or plats that you might submit for the record and would you identify the areas that you were talking about so that--I mean we are having--

DR. LIVINGSTON: I see.

MR. WHITE: We have a visual aid here and we are building a record. Could you be more definitive in your statement of where those samples were taken?

DR. LIVINGSTON: Yes. One of the main stations around which we were getting kills was right near the fish camp, which is located on the Mulat Bayou area, and it is along the trestles also of I believe it is the L&N Railroad.

The other major area of fish kills was in an area of the Escambia Shores Development area, where they have dredged out canals for future home sites.

Yes.

MR. RAVAN: That was a point I wanted to make or question. When you say they had or they did, prior to your study, after or during?

DR. LIVINGSTON: Prior to our study all of this dredging was accomplished.

MR. RAVAN: How long before?

DR. LIVINGSTON: I don't have all the dates on those at my fingertips, but it was a period of one to two years, I believe. I have the dates somewhere.

There is another thing I must say. This report that I am giving you now is simply an interim report. Most of my data right now is in the computers and I cannot give you a detailed analysis of the data, but I am trying to give you some of the high points about what we found out.

MR. RAVAN: Good. We would appreciate it.

DR. LIVINGSTON: I am not going to make a definitive remark, for instance, on the relative effects of dredging on this area, although I think we have a very good idea of what they are, simply because I don't want to speak without my data, naturally. And I can speak, though, to certain aspects of the problem, and I think with such a comprehensive look at a small area like this, between Dr. Hopkins and myself I think we are going to be able to come to some answers, perhaps, that have hitherto not been arrived at.

One thing that I think I must impress on you is this, that these fish kills--and as I say, we monitored right through them; at 3-hour intervals through a 24-hour period we were right there from the beginning to the end of a fish kill. And then, of course, I must say that we are doing this weekly, so we have got a very large amount of data that is very cumbersome; I have got to use computers to be able to analyze it.

Just off the top of my head, because I was there during the whole study and I have looked over all the data, I can say this, that the fish kills that are occurring are occurring due to a very complex series of events that are happening with this particular bayou, and the exact, shall I say,physiography of the bayou in mind. This has a great effect on the fish kills and why the fishes are dying. The current structure, I believe, is going to be very important. The eutrophication, the cultural eutrophication, is definitely a factor. The dredging would appear to be a factor, although, as I say, I hesitate to draw any fast conclusions about how much of a factor it is going to be until we look at more of the data.

The area itself is--and it is very obviously in an advanced state of cultural eutrophication, as everyone knows. Our dissolved oxygen, though, with this particular type of sampling program, we were able to show using the dissolved oxygen data primarily that it is a very complex picture with all of these aspects entering into it. So there is no simple way to get at this particular problem and I could probably talk with you all afternoon about just why I am saying that. I am not going to because I don't have the data here and you can't listen to me all afternoon.

But this particular area is definitely in a state of advanced eutrophication, with these areas (indicating) especially acutely affected, the dredging in this particular area. For instance, the dissolved oxygens for weeks on end in these particular areas would be zero. There would be no oxygen in that particular area. I am talking about the canals, now, in the Miami Shores area.

The other major area of fish kill would show pronounced fluctuations with--for instance, starting in July there would be the usual diurnal decrease in oxygen during the evening. As we get into August this diurnal pattern of high oxygen during the day, lower oxygen at night, was exaggarated with the oxygen going up higher during the day and down lower during the night. We could follow this right straight through to the kill, and as a matter of fact, we could almost predict the kill by looking at this kind of data, because when the dissolved oxygen reached a certain level, then all it needed was the fishes to come in that area and we knew that there was going to be a fish kill.

I hope eventually, with the large amount of data that we do have, that we can run, for instance, some sort of multivaried analysis to be able then to be predictive, and we possibly, by taking spot checks in different areas, can then predict where these fish kills might occur. It is very obvious right from the start that to have a fish kill you have to have the conditions, the physical and chemical conditions, as well as the fishes, and although the one thing that we don't have a great deal of data on is the predictive value of when these fishes are coming in, we do know that we will be able to show exactly when a fish kill can occur if the fishes do come in.

I would like to also address myself to one thing that I have heard and that is this, that the fishes are not necessarily committing suicide. They are not depleting the oxygen in the water to such an extent that they are dying simply from their own breathing. Some of these areas simply don't have any oxygen in them. The fishes get in there, get trapped and can't get out for one reason or another, and they die. They do aggravate a situation. If there is a large enough amount of fishes, it will aggravate an already aggravated situation and might worsen it. But some of these areas, especially in the Escambia Shores area, where there was absolutely no oxygen to begin with, the fish would simply run in there with probably--I am not going to say it is definite, but it looks like they are after the larger volumes of phytoplankton that are in the water. They will run into these areas and then at night they will usually start dying or even during the day.

The various dredged areas in this whole area down at depths, say--well, I can't say all of the depths, but let us say below 10 feet, usually, are usually anoxic and have greater and greater amounts of H_2S as you go down. They are areas of, I would say, very poor water. The effects of these dredged areas on the overall picture I will reserve until we analyze our data a little later.

The computerized portion of our research should bring out a lot more than what I am telling you now. I am just giving you a brief glimpse of what I can tell you are some of the highlights of what we can just pick out from the data without having to run to the computers. It is just such a pile of data that it is going to take a little time to analyze it. But I think we have enough so we can tell you pretty much what is going on in this bayou, what has gone on this past summer.

I am just going to stop talking now.

MR. WHITE: Do you anticipate that you will be able to make some recommendations for some remedial program in there?

DR. LIVINGSTON: It is highly possible.

MR. WHITE: What is the time frame?

DR. LIVINGSTON: Our report is--well, our grant runs out 1 May and we should have the report in within a month or so after that.

MR. WHITE: Mr. Levin.

MR. LEVIN: You have indicated that the area up there about--I can't see; my eyes aren't good--11(B) and 11(A)?

DR. LIVINGSTON: Yes.

MR. LEVIN: That is one of the areas of the problem?

DR. LIVINGSTON: Yes.

MR. LEVIN: And we know that is manmade dredging?

DR. LIVINGSTON: Yes.

MR. LEVIN: Now, the area around 7 that you said was also another area.

DR. LIVINGSTON: Yes.

MR. LEVIN: Is that dredged also in there?

DR. LIVINGSTON: Not to my knowledge. This is not a dredged area.

The reason that we threw our samples all over the bayou is this. We worked on a possible assumption that by opening the canal at the Escambia Shores end it is possible that the currents were adjusted in such a way as to isolate these areas from the usual tidal drainage. In other words, the tides are coming in and going out. And by isolating areas such as this, it would cause a stagnation to occur that possibly would add to the dissolved oxygen burden that is already there.

In other words, this whole area is connected. It is not a large area. So that by doing something over here (indicating), that doesn't preclude the events to occur over here (indicating) in relation to what you have done over here (indicating).

For instance, this whole area through here (indicating) is scoured. On an incoming tide we have preliminary evidence--we are going to do one more dye run--but preliminary evidence, for instance, that the tide simply runs in this end and right through and out the other, which was very surprising. We would have thought it might have been different, but it was not.

In other words, it is scoured, this whole area, until this is relatively deep all through here. Areas such as this (indicating) have been isolated, this area (indicating) is isolated, this area (indicating) is isolated, setting up, I would say, a potential for the--then the effects of what is a eutrophicated state to then take hold and have perhaps an exaggarated effect on the water and therefore the animals simply can't maintain themselves.

MR. LEVIN: The 13 and 14, is that a manmade pass in there?

DR. LIVINGSTON: Yes, this was dredged out and opened up by the Department of Transportation. In other words, this whole area was sealed off and we have aerial photographs of it before and after so that this was actually--I think there was a connection in here somewhere at one time, but it is pretty much a cul de sac.

MR. LEVIN: Well, I don't know whether this is practical or not, but I assume if it is taken out it can be put back. Suppose that thing is filled back in the way it was. What would you think would be the effect to the tide of having only one entrance in there around 5 and 6 the way it was when the Good Lord made it?

DR. LIVINGSTON: Now you are starting to nail me down to something I didn't want to talk about, because we are playing with--part of the purpose of this study for DOT is to put back what they took out in a place which would help the area, possibly. If this is feasible we will go ahead with this. That is one of the primary aims that we will advise them on.

However, the area has changed pretty drastically from when they originally dredged. Exactly where we would have them fill it, can be done in any number of places. For instance, how about doing it in this particular area (indicating) and dividing the two areas so that you have both areas being drained now since you do have a new area over here that you simply can't fill up? There is just too much for me to go into this right now.

MR. LEVIN: Let me ask you, were there fish kills in Mulatto Bayou any place other than those two specific points you pointed out during the time you were studying?

DR. LIVINGSTON: Yes. The water in this area would become depleted with oxygen and then with an outgoing tide this whole canal here would be filled with deoxygenated water and we did see fish kills occurring all along this area during outflowing tide.

MR. LEVIN: How about up around 1, 2, 3 and 4?

DR. LIVINGSTON: Nothing; we never saw any fish kill in that area. The dissolved oxygens in this area remained, well, relatively what you would consider stable for a particular shallow estuary.

MR. LEVIN: And that is all natural? That has not been--

DR. LIVINGSTON: To my knowledge this might have been dredged down here (indicating), but I am not sure. Dr. Hopkins would probably know more about that than I. But this is a relatively shallow area with no deep area in it that would add to any water quality deterioration. This area also is flushed by a stream. I haven't drawn that in, but the stream flushes this regularly.

You see, this is so much more complicated. For instance, we have to take into consideration rainfall patterns and how this area is getting groundwater and things like this which are all entering into this picture.

MR. LEVIN: But doesn't it seem like that really the fish kills have to be in some way in Mulatto Bayou related to the 11(A), 11(B) point or the 7 point, in some way?

DR. LIVINGSTON: I would say that during this summer when we were there and during the time that the kills were occurring this (indicating) would be one sensitive area and this (indicating) was very definitely another sensitive area. And we have quantitative proof of how these areas degenerated with time over the summer until they reached a point where they became lethal.

MR. LEVIN: Excuse me, but let me ask you this. Is there an outlet for the water going from 5, 6 into 7? Does it swing around and come out or is that a dead end up there where that fish camp is that you mentioned?

DR. LIVINGSTON: Oh, you mean up in here (indicating)?

MR. LEVIN: Yes.

DR. LIVINGSTON: No, this is closed, so that, you see, that it is a low energy area to begin with.

MR. LEVIN: Well, it goes back to your pattern of your tides which are completely ignoring 11(A) and 11(B) and 7, right? They are just circling and--

DR. LIVINGSTON: By opening this up, that is one hypothesis, yes, that by opening this up the water simply swings through without going--for instance, if we were to close this (indicating) off or close this off here (indicating), then the tidal currents would possibly drain this area and have much more effect on this whole area than they did before this was opened up.

MR. LEVIN: And if you didn't have the stream coming down where 1, 2 and 3 are, you would perhaps have a great number of fish kills up in there too, right?

DR. LIVINGSTON: Now you are talking in the realm of speculation. This is all speculation right now until we analyze this data, and the one main problem is that we don't have data before they opened it up, you see; then we would have it locked up. This way we can only speculate.

But I would say that with this particular type of tidal currents, this is one possible and very reasonable explanation of why that particular area in 7 would be going like it is.

MR. RAVAN: Again, how long did your study go on, four months?

DR. LIVINGSTON: We started in July and we are still going. It goes on until May. Dr. Hopkins has been working longer in there.

MR. RAVAN: And about how many square miles is that you have worked in?

DR. LIVINGSTON: Let me think. How many?

FROM THE FLOOR: Two hundred square acres.

DR. LIVINGSTON: I wouldn't know, but they say 200 square acres.

MR. RAVAN: How much did the study cost, how much do you think?

DR. LIVINGSTON: About $19,800.

MR. RAVAN: Nineteen eight?

DR. LIVINGSTON: Yes.

MR. RAVAN: Do you know of any such study ever having occurred with regard to Escambia Bay?

DR. LIVINGSTON: Similar to this one?

MR. RAVAN: Yes.

DR. LIVINGSTON: Dr. Hopkins has been studying this area for quite a while, not with the same approach, necessarily, but he has been studying it for a long time.

MR. RAVAN: Let's say with the same thoroughness that you just described.

DR. LIVINGSTON: Well, Dr. Hopkins is very thorough. (Laughter.) I would say that this area--you mean in this detail?

Have you done this, Tom? I haven't seen this kind of data in such detail, no.

MR. RAVAN: Dr. Hopkins, unfortunately, is just one man. The point I make is you did 20 stations. Have we done a 100-station study for eight months in Escambia?

DR. LIVINGSTON: I know of none.

MR. RAVAN: Do you think that would be beneficial?

DR. LIVINGSTON: Well, I don't see how you make any estimate on a scattering of data anyway. If you come in in a couple of week period and go out again, I don't see how you can make any kind of reasonable assessment without looking at this situation over a long-range period of time.

Any area like this is so complex that you can waste a lot of time by simply coming in, hitting it and running again without doing a comprehensive long-term study on the area. There is no doubt in my mind--

MR. RAVAN: But you know of no such comprehensive long-term study having been done in Escambia?

DR. LIVINGSTON: Yes, there are other studies that have been done, but I know of--well, for instance, no one on this particular area that has been done in this detail, no.

MR. WHITE: Mr Levin has one.

MR. LEVIN: Sir, have you considered the possibility of--or would you consider the possibility of perhaps opening up this area down in here (indicating) so that perhaps your tide might could swing in there as well?

DR. LIVINGSTON: That is a third alternative, yes. I have considered it. I haven't conferred with Dr. Hopkins yet, but I have considered that as an alternative.

MR. LEVIN: And then it would seem if that should take place, then our only problem probably would be right in there (indicating), wouldn't it?

DR. LIVINGSTON: It is a possibility, yes. To be honest, again, this is all on preliminary estimates of the data. Until I have the data in front of me I can't really make any hard and fast decision, plus the fact I would warn you or anyone who would go into this area and do this to be very careful with what you are doing. You could simply aggravate an already aggravated situation. That is why I am reluctant to really say what we would decide.

MR. LEVIN: I just wanted to find out, you were considering that possibility?

DR. LIVINGSTON: I considered that as a third but a remote possibility.

MR. WHITE: Mr. Traina.

MR. TRAINA: Dr. Livingston, did you say that most of the fish kills in this entire area have been concentrated in Mulatto Bayou? Is that what I understood you to say?

DR. LIVINGSTON: Pardon me?

MR. TRAINA: That most of the fish kills that occurred generally in Escambia Bay have been concentrated in Mulatto Bayou?

DR. LIVINGSTON: I couldn't speak to that. There are a large number of fish kills in this particular bayou, though. There are a large number of fishes dying, but throughout the summer,of course, there were other areas that were being built.

MR. TRAINA: In the beginning, to go back over history here, back in 1968 and 1969 when some of these major kills began to occur, at least coming to our attention, Mulatto Bayou was the focus of the fish kills at that time. They apparently have extended out into the bay. And again I am asking you to maybe draw conclusions here that are not warranted based on what you have so far--

(Off the record.)

MR. TRAINA: As I started to say, I want to ask you maybe to draw a conclusion. The fish kills that seemed to be began occurring in the Mulatto Bayou area. From what you are saying here, at least there is a concentration of the fish kills still in this area. Would you like to conclude now that Mulatto Bayou has been the source of kills, not in terms of pollution source, but if we could solve the problem of Mulatto Bayou we may solve the problem of the bay?

DR. LIVINGSTON: I would hate to say yes to that. As a matter of fact, I would rather say no simply because this area is different from most of the other areas of the bay. Each area has its own problems, is what I am trying to say, so that to solve the problems here might not solve the problems in the rest of the bay.

One thing that would solve the overall problem, of course, would be for the overall area to become less eutrophicated. That would solve a lot of problems.

But to solve these particular problems and to apply them to other bayous, if that is what you are getting at, I would hate to do that because simply there might be other problems in other parts of the bay that we are not considering.

MR. TRAINA: It was reported to us last year, I have forgotten the depth of it, but this large hole that was created because of the construction of I-10 for dredge material. Where is that located?

DR. LIVINGSTON: That is right here (indicating).

MR. TRAINA: That seems to be in the path of this water that you are saying is coming through t--

DR. LIVINGSTON: Well, it is a little to the left side of it. The water is pretty much bypassing that. There isn't a great deal of water flowing either in or out of that area unless it is a large runoff. We have noticed during times of large rains, for instance, that the area would be somewhat clear, but it is usually a bypass.

MR. TRAINA: So you think that the water contained in that is not affecting the water quality in the rest of it?

DR. LIVINGSTON: You are now trying to nail me down on something that I told you I could not make a--

MR. TRAINA: You will excuse us, but we are all trying to nail this thing down.

One other question. When was this canal opened, the one that is down in--I get my directions mixed up here, but--

DR. LIVINGSTON: It was, I think, between 2 and 3 years ago. I don't have all this data at my fingertips.

MR. TRAINA: Which places it about 1968?

DR. LIVINGSTON: Around that time, I believe.

MR. TRAINA: Which would place it around the time that we had a lot of the fish kills began to be reported.

DR. LIVINGSTON: Again I would address this particular information to Dr. Hopkins. He has been in this area longer than I have and he could answer these with facility, whereas I have only been in here since July.

MR. TRAINA: Again, this is probably an unfair question. Let me ask it anyhow.

What kinds of problems do you see immediately in terms of water quality of the fishery resource or any other problems, even, with regard to access in and out if that canal was closed?

DR. LIVINGSTON: Well, it could cause just as bad a situation as we have now, possibly, simply because it would be a cul-de-sac also and if the tidal currents would not clear it out, with those holes in the way they are and with the water quality being deteriorated in those canals, the fish could still make it through there and get into those areas and if it wasn't thoroughly washed out you might even have greater fish kills. That is one of the considerations that we have to take into account.

MR. TRAINA: What is the canal used for now, do you know?

DR. LIVINGSTON: Just boating.

MR. TRAINA: Commercial, pleasure boating?

DR. LIVINGSTON: Mostly pleasure. It is a small canal. This is a small area, generally.

MR. TRAINA: Let me ask a question with regard to that development you talked about, I have forgotten the name of it, Homestead?

DR. LIVINGSTON: No, it is called, I believe, Escambia Shores.

MR. TRAINA: Do they take dredge from the bay and fill that area in?

DR. LIVINGSTON: No, they dredged canals out of here and threw the spoil up on banks on either side of these canals. These are simply dredged out.

MR. TRAINA: I see. But they, in fact, have created poor circulation for that part of the--

DR. LIVINGSTON: It is a cul-de-sac. It is terrible circulation and these are areas that we have found the worst water quality in those particular canals and in water associated with it.

MR. TRAINA: Does that water get out into the other areas that you had the fish kills?

DR. LIVINGSTON: Yes, as I say, on the outgoing tide we did find this water draining right down. It depends a lot on the wind and the rain in the area and, oh, a whole series of other things, tidal currents, and so on. I mean it is a very complicated picture.

MR. TRAINA: Just to make it common, it appears from what you said, and based on other information that this conference received, that a strong possibility exists that the opening of that canal may have had something to do with a proliferation of the fish kills, maybe not the only cause.

DR. LIVINGSTON: Again you are trying to nail me down to something that I don't want--

MR. TRAINA: That is the business we are in, sir, trying to pin you down.

DR. LIVINGSTON: Yes. If I had my whole report in front of me I would be glad to answer these questions, but I don't want to answer any questions that I don't have scientific proof of.

MR. TRAINA: Do you think you would be in a position of answering those questions with some specificity?

DR. LIVINGSTON: Again I don't know until I look at my data, and I feel that we will have enough data to possibly approach the answer.

Let me tell you this from the beginning. I don't think you are going to get at the ultimate answer of any of this because of the way it has been done and over the time period that it has been done, because we can't go in and tell you what the area was before, so ultimately you are not going to get a final scientific solution after, you can't expect that.

But what we can do is simply tell you in empirical terms what happened last summer, how the fish kills occurred and all of the events leading up to that, and then the events that went beyond that. And I am afraid you are going to have to read my report and draw your own conclusions as to how much of a percentage you could say opening that canal would have. I don't think it will ever get to that--

I would say this, though. It is a strong possibility that this did have some effect on the area, but it is still just a possibility in my mind.

MR. TRAINA: Maybe one question, one final question.

Did you say the Department of Transportation--I assume that is the State Department of Transportation?

DR. LIVINGSTON: That is right.

MR. TRAINA: --is committed to doing whatever needs to be done to rectify? Is this the basis of your work?

DR. LIVINGSTON: I don't know, whatever can be done, but they are committed or have committed themselves to me to move on my advice or on our advice, Dr. Hopkins and myself, to try to by refilling the area improve the situation if they can, yes.

MR. TRAINA: I see. Thank you, sir.

MR. WHITE: Mr. Levin, do you have another question?

MR. LEVIN: All I wanted to do was to find out if anybody knew any of the data before this canal was built? Maybe that would help us in some way.

DR. LIVINGSTON: I think you ought to ask this to Dr. Hopkins.

MR. LEVIN: That is what I want to do.

DR. LIVINGSTON: Again, he is the man who has been in there longer than I have. I have just been in here since July. He has got a great deal of data that went on before this, so he would be a good person to ask.

MR. LEVIN: But doesn't it seem pretty clear to you-- and again, I am not trying to pin you down, but doesn't it seem like that if you were a lawyer instead of a scientist that if you were trying to decide what the preponderance of the evidence was, so to speak, that doesn't it look like the problem seems to be that these things occur in dead ends and these fish get themselves up in there and they can't get out in time before they suffocate themselves? Isn't that a pretty fair assumption?

DR. LIVINGSTON: If I was a lawyer and not a scientist I would sue the hell out of them. (Laughter.)

MR. LEVIN: Sue the hell out of who?

DR. LIVINGSTON: The people who dredged this area. But then I am not a lawyer, so I won't say that.

MR. LEVIN: You sound like you are very proud of that. (Laughter.)

MR. WHITE: Thank you very much, Dr. Livingston.

Off the record.

(Off the record.)

MR. WHITE: We are back on the record.

Let me clarify something. We talked around this plat and nobody could really follow it. I think it has been very beneficial to the conferees, but just for the little lady who is going to be reading this record I want to point out that we are not going to have this map in. This was simply a visual aid to assist us.

Proceed, Mr. Mauriello.

MR. MAURIELLO: Dr. Hopkins, would you like to add any comments to Dr. Livingston's?

DR. THOMAS S. HOPKINS
ASSOCIATE PROFESSOR
CHAIRMAN, BIOLOGY DEPARTMENT
UNIVERSITY OF WEST FLORIDA
PENSACOLA, FLORIDA

DR. HOPKINS: We would like to make a presentation with regard to our portion of the data and I would like to say that there is considerable background information on Mulatto Bayou as a result of a Bureau of Fisheries contract to study the area with regard to pesticides. That information will be made available to the conferees.

In addition, we have some data with regard to the immediate effects of dredging during the time of dredging the canal that he was talking about going through here. I do not want to present it at this time, but if so requested will submit it within the 30 days.

I would like to call on my graduate student or a graduate student from the University, Ken Adams, to talk about the primary productivity aspects, because I think this will tie in very well with the arguments that we have had with regard to why fish go to Mulat Bayou. After Ken's presentation I would like to summarize and answer any questions you may have.

MR. LEVIN: You don't want us to ask questions now?

DR. HOPKINS: No, but let's let Ken tell about what we know. It gets back to the background question. We think we have an answer to some of the background information.

Ken.

MR. WHITE: If you will stand by too, Tom, until the time to ask questions.

DR. HOPKINS: I will be right behind.

Kenny.

We have some before and after slides of what you have seen here. I think,again,we can submit these things. We can't submit them today, but we can submit all the visual materials.

MR. WHITE: Everything that you use, then--

DR. HOPKINS: Will go into the record.

MR. WHITE: --you should submit to us for the record.

DR. HOPKINS: Yes, sir. Yes, sir.

MR. WHITE: Fine.

DR. HOPKINS: It is being prepared. We just couldn't get it through the photo lab in time.

MR. ADAMS: Do you want to do this?

MR. WHITE: We will go off the record while you set up.

(Off the record.)

MR. WHITE: Let's go back on the record, again, and

NOTE:

Dr. Hopkins was requested repeatedly to submit materials (see p. 289), but they were not received.

start with the presentation.

KEN ADAMS, GRADUATE STUDENT
UNIVERSITY OF WEST FLORIDA
PENSACOLA, FLORIDA

MR. ADAMS: In the way of introduction, primary productivity of the energy transformations that occur within ecosystems is the initial and, therefore, basic to the formation of all food webs and it also has value as an indicator of relative stability and the general trophic condition of a system.

For background information I went to the BCF study that Dr. Hopkins has mentioned, and unfortunately we won't be able to show these to the general audience.

Here we have primary productivity data for about eight months correlated with nutrient data.

MR. WHITE: Would you explain the charts to us a little, I mean what you are getting at?

MR. ADAMS: Certainly.

On this scale we have milligrams of carbon per square meter per hour surface values. This is gross, net and respiration across here. You will note the erratic value of these. The triangles are nitrates and the circles are temperature, water temperature.

Over here we have the same thing basically except we have four different depths, carbon in milligrams per cubic meter per hour. Here we see the same fluctuation with indications of negative respiration at times.

With this in mind, I started my study of Mulatto Bayou on July 11, and for sake of comparison I chose Catfish Basin, which lies on the eastern shore of Blackwater Bay, as a control area. You can notice it up there. It is on the eastern shore of Blackwater Bay; it would be in this area (indicating) on the same map, while Mulatto Bayou is situated here (indicating).

DR. HOPKINS: This is the Catfish (indicating) and Mulatto (indicating).

MR. ADAMS: Comparing the two, Mulatto has a drainage basin of 135.6 hectares and a surface area of 89.08 hectares, a mean depth of 1.5 meters. Catfish Basin has a surface area of 132.8 hectares, 88.56 hectares is the surface area, the mean depth is 1.2 meters.

The procedure followed was that at weekly intervals three sites were sampled at three depths, surface, half meter and one meter. The light bottoms were done in triplicate and a common incubation site was chosen to assure identical temperature and illumination. Water chemistry samples were also taken from these three sites.

Here we have Mulatto Bayou, north being toward the top. My site 2 is the triangle at the upper portion.

DR. HOPKINS: This one (indicating), Ken?

MR. ADAMS: Right. And my site 3 was at the bottom triangle right there (indicating), and at Catfish Basin--

DR. HOPKINS: Wait a minute, I will get an outline of Catfish.

MR. ADAMS: O. K.

MR. WHITE: Off the record just a second.

(Off the record.)

MR. WHITE: Back on the record.

MR. ADAMS: Site 3 was at a central site in Catfish Basin right there, and I compared the primary productivity in water chemistry of these three sites at weekly intervals, as I stated. The methods employed were the C-14 method for primary productivity and standard colormetric methods for nitrate, phosphate and ammonia.

Here we see the results of 20 weeks of sampling. This is the primary productivity in Catfish Basin, carbon, milligrams and cubic meters per hour.

And the carbon fixation ranged from 0.92 on August 1 to 26.34 on September 1. As you can see, this is relatively stable in load.

The nitrate levels in Catfish Basin, which are represented by triangles, varied from 0.02 at several dates to 0.20 on November 7. And the ammonia, which is represented by squares, varied from 16 ppb to 98 ppb on September 26, and 16 ppb was on November 21. The nitrates were given in parts per million, that is 0.02 ppm to 0.20 ppm.

This is site 2 in Mulatto Bayou. Primary productivity, as you can see, is rather erratic.

The carbon fixation values varied from 2.39 on August 1 to 137.37 on August 8.

The nitrate values at site 2 varied from 0.02 on July 11 to 0.17 on August 1.

And the ammonia values varied from 8 ppb on November 21 to 335 ppb on August 1. And this ran off the chart; it is 335 ppb.

This is site 3, primary productivity. Carbon values ranged from 1.14 on August 1 to 132.65 on August 8.

Nitrate values varied from 0.02 on July 11 to 0.22 on July 18 at site 3.

The ammonia values varied from 15 ppb on November 27 to 315 ppb on August 1, similar to those at site 2.

To point out some interesting sidelines here, on August 1, the day that the ammonia was so very high, the productivity was down, it was a day of continuous downpour, high rainfall. And the others just show the erratic nature of the high productivity of sites 2 and 3 in Mulatto and the low productivity, phytoplanktonwise, in Catfish Basin.

MR. WHITE: Is that it?

MR. ADAMS: That is it.

MR. TRAINA: Mr. Adams, when you say carbon do you mean total organic carbon?

MR. ADAMS: No, sir. Carbon assimilated by phytoplankton.

MR. TRAINA: Oh, I see. You didn't do any TOC in any of these areas?

MR. ADAMS: No.

MR. TRAINA: Would you like to venture any kind of estimate as to what the TOC might be in Catfish Basin?

MR. ADAMS: I have no idea.

MR. TRAINA: Thank you.

MR. WHITE: Any other comments or questions?

Thank you very much, Mr. Adams.

MR. ADAMS: Thank you.

DR. THOMAS S. HOPKINS
ASSOCIATE PROFESSOR
CHAIRMAN, BIOLOGY DEPARTMENT
UNIVERSITY OF WEST FLORIDA
PENSACOLA, FLORIDA
(RESUMES)

DR. HOPKINS: I would like to try and tie in what Kenny has presented with regard to some of the things that have preceded.

In Dr. Duke's statement this morning we heard from Sam Tagatz with regard to menhaden and we know that Mulat-Mulatto Bayou has been a very attractive site to menhaden for a long period of time, much to the detriment of the area, I believe.

I believe that in undertaking what we have in terms of establishing Catfish as the control,we tried to find an area, as Kenny said, comparable and one which might resemble what Mulatto Bayou was historically. We do have before and after photographs of Mulatto Bayou which we will enclose for the record.

The point that we wish to establish is that with regard to water chemistry, phytoplankton production, Catfish is a relatively low productive but highly stable ecosystem.

We suspect that, I would say, based on the grass found around Catfish Basin that it was in fact very much like Mulatto Bayou was at one time.

And we see in comparison that Mulatto Bayou was a very erratic, unstable ecosystem, great phytoplankton changes. We can see periods of deficit respiration, that is to say all of the phytoplankton production went into maintaining the community. I believe that this supports the idea that fish are indeed attracted to Mulatto Bayou and when we look at the fish data per se, the catch per unit effort, which we cannot give right now, but the catch per unit effort we do know in Catfish Basin is virtually nonexistent compared to Mulatto.

We have established seine on-sites that we have been occupying for the past six months, we will occupy them for another six months, but in essence we get no menhaden in Catfish and, of course, we get more than we can count out of Mulatto.

I believe this completely substantiates the feeling that Mulatto is an attractant source.

MR. WHITE: Mr. Levin.

MR. LEVIN: Tom, I have just looked over a log of fish kills in 1971 and it seems like almost without exception these fish kills took place in these bayous and these places.

For example, what do they call it, Bass?

DR. HOPKINS: Basso Cove?

MR. LEVIN: Yes. And Saultsman Bayou and Hoffman--well, Hoffman Bayou of course is over here. Judges Bayou. Has there been any dredging--

DR. HOPKINS: Judges Bayou is here (indicating), Basso Cove is up here (indicating), which one--Hoffman's is over here in Gulf Breeze. We will eliminate it.

MR. LEVIN: Have there been any fish kills out in the bay itself proper?

DR. HOPKINS: Yes, sir. Yes, sir. I would like to speak to that if I can, just briefly.

In April, May, and June, Ken? In April, May, and June of this year we occupied something like 44 stations in the bay. We divided the bay into segments occupying three stations in a segment, taking salinity, temperature, and dissolved oxygen, and at that time we found rather poor water quality conditions from the standpoint of dissolved oxygen existing in Escambia Bay. So Kenny and those people working in the project then knew we were going to have fish kills in the major part of the bay later on during the summer.

MR. LEVIN: And we did in fact?

DR. HOPKINS: We did in fact, yes, sir. And I have just reams of that dissolved oxygen, salinity, temperature data and when I can find the time I would be happy to submit it, but right now it is a matter of trying to get everything together. But we can document poor water quality conditions throughout the bay in April, May and June.

To take off on a point I think that Mr. Traina was asking and Skip not willing to answer, I personally feel that indeed if we could solve the problems of Mulatto Bayou we have in fact solved the problems of the bay. I have worked in the bayou for three years; obviously I am emotionally attached to it. You can't spend that many hours, as my wife says--well, forget it. (Laughter.) But anyway, the more I see of that, and I see the bay, one can say, O. K., what about dredging? The ship channel, there is no question about it, the ship channel acts as a reservoir for transporting low dissolved oxygen water all the way up to the Monsanto plant and all the way out here. We have encountered DO's as low as 2 ppm right here at the causeway bridge, that was in 1969, and it is being transported through that vehicle. So there is one way of dredging.

There is no question that the problems of Mulatto Bayou, in my mind, are tied up with decreased circulation problems because they change the flow of water. And I have documents where I protested against some of the things several years ago and I don't want to say I have told you so, but I hope that I am going to be able to say I told you so.

But I think that with regard to circulation dredging that this area has become eutrophied in much the same way that Judges Bayou and others have with regard to the buildup of wastes during water periods that in essence push them up. If we could look at the nutrient buildup in these areas here as a backup, as a result of wastes drifting back this way, just as wastes have been carried in here (indicating), with regard to the point you were making here (indicating), I know by visual observations when one of the industries several years ago broke down, I know exactly where the wastes went into the bayou and it is carried up into here (indicating) and it is carried as far northward as the bridge. So there is no question that wastes are transported into these isolated areas and then they are not effectively transported back out.

MR. LEVIN: Tell me, if you would go into it a little bit more, when you said that in your judgment if we find the answer to the problems of Mulatto Bayou we are going to find the answer to the bay, tell me what you mean by that.

DR. HOPKINS: Yes, this is an oversimplification, but I think that since I made the statement I would like to.

Dr. T. S. Hopkins

If we could restore a better circulation pattern to Mulatto Bayou, and I have my own opinions and they are on record so it is really nothing new, and it would be sealing off the lower end, I proposed it two years ago, I still feel that all the evidence justifies my position of two years ago except that now we have some hard data and I hope we have some good hard knot concessions as to what the data means. But in essence I would return the flow so that the drainage basin would go out through the trestle and it would flush this area in here (indicating), which is a prime nursery area, and through flushing it it would rejuvenate the sediments, I believe, keep the sediments oxygenated. Then the next step would be to replace and experimentally put in artificial grass to provide a place for the shrimps and small fishes to hide from their predators, because this area up until about 1966 did have marine grasses in it. I could get affidavits from people that live on the bayou that will tell you that there were marine grasses. She can even tell you when the marine grasses died, because she was pregnant at the time. Very good marker.

But if we could then experiment with this area and demonstrate that we could show the return of the nursery, then I think the next step is to go to the bay with regard to the establishment of certain areas if we know that they are not too high and put in these same artificial marine grass mats to allow the young fishes, the sea trout, and so forth, to have a place to hide.

So from the standpoint of minor scale engineering here, looking at it as a model, then I think we can apply some of those principles to the restoration of the bay.

MR. LEVIN: Yes, but what I am getting at, even if you get this circulation problem worked out, in your judgment does that detract from the thought of trying to get the nutrients out of the bay?

DR. HOPKINS: Oh, the nutrients have to come out of the bay. There is no point in really doing any restoration work until there is some good evidence that you are going to get a stability in the levels of dissolved oxygen and the phytoplankton levels. Well, that goes right back to the nutrients.

Now, my point about Mulatto is, personally I feel if we sealed off the lower end so that the flow was primarily from here, you wouldn't get the influx of nutrients that we do. We average something like 0.25 milligrams of nitrate in Mulat Bayou, and that is about 10 times too high.

MR. LEVIN: It is a combination of the lack of circulation plus the addition of the nutrients?

DR. HOPKINS: That is right.

MR. LEVIN: All right.

Tom, you mentioned something yesterday when we talked about the possibility of another source of water coming from some other river that could possibly be used to help flush this bay. Where is that located?

DR. HOPKINS: Yes, historically if you look back to Army Map Service maps you will see that the White River and the Simpson River tied in, which come in right here at Basso Cove, they tied into the White River up on Escambia,and through the years, for reasons not entirely known to me, certainly, but through the years those avenues of water into this portion of the bay have been sealed off.

Now, it is my feeling, and I certainly don't know, but it is my feeling that, one, the hydraulic force of the Escambia River has been changed because we have deepened and widened it as a ship channel, and so that may have diluted the force of the White River and allowed those rivers to seal off. I feel like that the White River, personally, and it would require some study of hydraulics with some other people, that if we could go back in and open up and channel, if you will, fresh water from the White River into the White and Simpson here, it would maintain a better flushing in this area up here and I think it would provide more oxygenated water to areas up here which stand stagnant at periods. The bream fishermen during the summer mounted a patrol of Saultsman Bayou and all through here and we found numerous opportunities for fish kill, although the fish weren't dying the conditions were there, simply because of stagnant waters. And I think that flowing water through that area, if nothing else, would eliminate the stagnant conditions. I can't see how anybody could argue against that.

Just how it would affect this area down in here I don't know, but one would hope that if it was beneficial there that it would also add here, because we do know that wastes go north from this area here and follow the shoreline into Basso Cove.

MR.LEVIN: Do you have an opinion as to whether or not it is going to require the complete cessation of any discharge into that body of water in order for it to be restored or do you feel like that it would still be able to--let's say if we could get 94 or 95 percent removal, do you have an opinion as to whether or not that would be sufficient?

DR. HOPKINS: Yes, sir, I have an opinion. And my opinion at this time is that although getting the discharge completely out of the bay might be ideal, I am not really convinced that going to that extreme is justified for the effort. In other words, it is sort of like in an optimization model you can do so much and then after that you are just pouring extra in for very little gain, and I feel like right now that I personally, and as I said, a person looking at this bay for four years, I would be very happy to sit on the 94 percent for a year or two before I go to that extra effort of getting that other 6 percent, because there may be some value in an optimization of the bay system, we don't know. We do know we have got a hell of a lot of excess, we have got a lot of excess in the sediments, and we don't know the rates of recirculation and resuspension.

So until we know those, my own feeling, Mr. Levin, is that I would not go that extra 6 percent just yet. I think we need some real hard looks at other things that Alec is going to talk about before we go to that step.

MR. LEVIN: Of course the problem that I can see in the future is it is obvious, I think it is obvious, that we are going to have more fish kills this summer.

DR. HOPKINS: No question.

MR. LEVIN: O. K. Now, I am trying to think out in my own mind what that is going to do to your theory, and I am sure it wouldn't from a scientific standpoint, but from a public standpoint, when we are taking these calculated risks, so to speak, and the fish kills keep occurring, in your judgment they would keep occurring even if it was stopped immediately?

DR. HOPKINS: If we stop last year we are going to have fish kills next year, Mr. Levin, because the amount of phosphorus and nitrates, and so forth, tied up in these systems--for example, in this deep hole in Mulat, if I remember the studies that were done in 1969, it is something like 20 times the normal concentration of nitrates found in that deep hole, 20 times the normal concentration.

MR. LEVIN: You think that hole has a whole lot to do with the problem?

DR. HOPKINS: With regard to Mulat Bayou there is no question in my mind. And I feel like, as I said, I have got water chemistry data for a year or two in there and it is just a--below 10 feet it is a hydrogen sulfide--

MR. LEVIN: All right. Now, here comes the big question. Assume we do everything we can. Apparently the big problem, as I see it, based on what I have heard today, the big problem has a lot to do, let me put it that way, with the poor circulation and the dead end, so to speak, in these smaller bayous?

DR. HOPKINS: Yes, sir.

MR. LEVIN: All right. If we started concentrating on closing up these particular areas that you have recommended, investigate the possibility of opening up that other source of water into northern Escambia Bay so as to assist that flushing out, so to speak, all right, now, and then concentrate on the industries trying to get 94 percent removal, so to speak, do you feel like that we would be well on our way to coming up with an answer to--

And let me give you part B to that question.

DR. HOPKINS: O. K.

MR. LEVIN: Do you think that we ought to try to work on the L&N Railroad and perhaps I-10--boy, that is a big jump--to try to make it easier for that bay to flush itself out?

DR. HOPKINS: Well, that is about an A, B and a C.

But to begin with, I know I am not going to make myself popular by more or less saying all of the industries out by 1973, but I quite frankly feel that way right now for the reasons stated.

But with regard to the 94 percent, I do believe in the 94 percent by 1972 and that in fact as they are approaching it now it may be reasonable to assume that already the nutrient levels in the water column are going to dissipate slowly. I wish we had that information. Unfortunately we don't.

With regard to hindered circulation, yes, I still believe that the L&N Railroad has a lot to do with the hindered circulation plus the strange morphometry right here. We have some information that shows that on a heavy rain the salinity comes out of the upper--this whole area will move out as one block of water and it can be contained from top to bottom as one homogenous block and it will stretch from there to there and it represents virtually all the salt water in that bay. And this is a very strange phenomenon. It doesn't trickle out, it just comes out in a big slug. And we saw this in February and can document it fairly closely.

I believe, then, that this does act as a barrier to hold up water flow under normal conditions and that the other thing we need to look at now that we have cut the pilings out, as I mentioned the other day, we need to look at how sediments have redistributed themselves with regard to their nutrient concentrations.

MR. LEVIN: How much money do you think it would take--wait a minute, now, I am not asking you--I am talking about perhaps additional study on this thing, how much money do you think it would take and how long would it take to come up with some specific A, B, C, D concrete recommendations so that we could arrive at the best possible--I don't mean possible--feasible, the most feasible solution to try to restore this body of water?

DR. HOPKINS: Well, I think--

MR. LEVIN: In other words, let you take a look at all the bayous, the L&N trestle, the industries, the Gulf Power, the Escambia River. I know you have done probably, like you said, four years work on this thing and, of course, we would be calling on you on that vast storehouse of knowledge that you have gained and we would be availing ourselves of it probably free of charge.

But what I am saying is, how long do you think it would take and how much money would it take for you to give us some definitive recommendations that we can get to right quick so that we can get this body of water back to where it was?

DR. HOPKINS: Well, this is one of the reasons why I more or less am willing to go along with the 94 percent at this time. I think that since there are so many unanswered questions that Tom Duke and Phil Doherty and I have asked, and in spite of the fact that the people of Pensacola are tired of one more study, I don't think that we are doing one more study in order to change that, but there are indeed questions about the levels of nutrients, and so I think that a minimum of one year in the field is necessary, a minimum of one year in the field. I would like to have two. During that time, and Alec is going to get into this more, there are a number of things that should be done to pinpoint tidal movement in relation to wind currents in various segments of the bay: take a segment at a time, set the wind conditions, set the tide conditions, where is the water going. Then with that you can predict, O. K., with the wind and water moving in that way, knowing what the nutrient load is and the sediments there, you can predict its effect on resuspension or how far it is going to be transported. And all of these questions need to be known before you pull out that last 6 percent because it just may be that the problem is greater than that.

Let me also add, because I don't want to keep harping on it, but then I would say after you get to the 94 percent then you push them for that last 6 percent as fast as they can get it, because I would assume technology is becoming closer and closer.

But there are other things too, like relocation of the outfall of perhaps Escambia Air Products, relocation of their outfall so that their 6 percent as it is would get a more direct shot towards removal and dispersion, these kinds of things.

MR. LEVIN: All right, you have told me one part of the question.

DR. HOPKINS: O. K.

MR. LEVIN: You said it would take a year?

DR. HOPKINS: At least a year.

MR. LEVIN: Now let's get to the other part.

DR. HOPKINS: The money?

MR. LEVIN: Because I was thinking, wouldn't it be nice if the industries were to volunteer to pay for this study? I was just thinking that. (Applause.)

DR. HOPKINS: Well, a long time ago Don Brown, who was with the Department, and Fred Waldinger and I undertook such a task to figure it out and we came up with a three-year study and it was over $1 million, so we tore up all our papers and started over again.

I believe with the combined efforts of Dr. Duke's laboratory and the industry and the whole bag, and assuming capabilities, it should be done for less than a half a million dollars. But really we would have to sit down and generate cost. It probably could run less than that, because it is not that big of a problem logistically. The big problem is finding lab space and running the samples--

MR. WHITE: If I might interject myself here.

DR. HOPKINS: Surely.

MR. WHITE: And I do believe Mr. Little is going to go into some of this.

DR. HOPKINS: Yes.

MR. WHITE: But now, in a partial answer to one of Mr. Levin's questions, I believe that, say, a definitive outline could be developed in a short period of time as to the needs, who would need to do what--

DR. HOPKINS: Yes, sir.

MR. WHITE: --and what the estimates would be. This would be, say, 30 days?

DR. HOPKINS: In at least 30 days, yes, sir, and that is Mr. Little and Mr. Duke's and my time.

MR. WHITE: Go ahead, Mr. Levin.

MR. LEVIN: He has answered my question.

MR. TRAINA: I have some specific technical questions I would like to ask you.

DR. HOPKINS: Yes.

MR. TRAINA: First you had mentioned on the one hand that you think that perhaps we can get by with the 94 percent and make some decision about the remaining 6 percent later. Then on the other hand you talked about, which we had confirmed in our own studies over the years, the high levels of nutrient materials in the bottom muds.

DR. HOPKINS: Right.

MR. TRAINA: And I assume that there would be recycling of that?

DR. HOPKINS: Yes.

MR. TRAINA: How do you compare those?

DR. HOPKINS: Right. It is just an assumption, and there again, I think if we knew more about the turnover time for water and reconfirmed some of the data presented last year with regard to recycling time that we could assume for the basis of another year or so that the water column could in fact assimilate that 6 percent, depending on--and if we could define exactly what we are assimilating. And as you know, the major problem here is that we have all three necessary nutrients going in, carbon, nitrogen and phosphorus.

All right. Now, since we know the phytoplankton dies off, the population dies off during the winter, if we could in fact change the nutrient structure of the water column and then hold down the discharges so there aren't these opportunities for it to build up in the summertime, we might get a hold on the water column and in fact we might assume for the sake of argument that the water column through the bay with increased flushing could in fact assimilate the waste loading of that 6 percent that has been allowed.

As you say, then our next problem is, O. K., what about the stuff from the bottom? Well, that we can't assume is going to be assimilated and we have to assume that, if you will, it is going to be taken care of in other means. Now, several means. It could become buried by a mass transport of sediment through the various systems, it could be shifted and thinned out into other areas where it exerts less effect. And it is just conjecture, Paul, that I think it is--

MR. TRAINA: You heard, Tom, this morning a considerable amount of discussion with regard to the water quality coming down from the Escambia River and talk about background or natural sources, and so on. Here again, how does that fact, assuming it is a fact, that we are getting levels of nitrogen, phosphorus, and carbon from rural and urban runoff, how would that jibe with what you are saying with regard to allowing that 6 percent still in the bay?

DR. HOPKINS: Well, when we talk about that problem up there, I think we have to keep in mind that several years ago I suggested that a gyre exists in here that keeps things in suspension longer than usual and longer than they should be, and I think this has been shown by the Federal reports. And I say again that by breaking this gyre so that an organic carbon particle and a nitrogen particle and a phosphorus particle or even a phytoplankton itself would not stay as long in residence up here exerting the effect on the system that it does, that that is a key to the problem.

MR. TRAINA: You are saying that if we could open up the bay to take advantage of the entire bay--

DR. HOPKINS: Yes.

MR. TRAINA: --the problem of upstream sources may not be as significant?

DR. HOPKINS: It would help, I think.

MR. TRAINA: It would help?

DR. HOPKINS: I think it would help.

MR. TRAINA: Some specific questions with regard to Mulatto Bayou.

Again, when we first came down here in 1970 this question had come up,and we reported at that time this opening of the canal. Frankly, I am going to direct the same blunt question to you as I did to Dr. Livingston.

What problems do you foresee if that canal was closed?

DR. HOPKINS: Political.

MR. TRAINA: Do you think--

DR. HOPKINS: Sociological, economic.

MR. TRAINA: Do you think there are going to be severe water quality problems with attendant aquatic life problems if that canal is closed?

DR. HOPKINS: No. I think that the quality of life in Mulatto Bayou will improve by leaps and bounds, and I pray that it does if they do it. We are liable to be in trouble if they don't. (Laughter.)

MR. TRAINA: Tom, we are facing within the next four to five months another summer period and everybody down here and those of us in Atlanta and Tallahassee and other places dread that summer period because we know what to expect. Would you like to suggest or take the suggestion that we get about closing that canal now before the summer is upon us and see what happens?

DR. HOPKINS: Yes, sir, because I made that recommendation over a year ago and I certainly won't back off on it from what I know right now. Every major fish kill or at least the major continuing fish kills have happened south of the gap, so to speak, in the last couple of years. Now, I realize the ones that happened a long time ago in 1969 happened right in this area right here (indicating), but I believe the bream fishermen and other people, Dr. Livingston's own fish kill slides, will show you that in the last few years they have been connected with the dredge and fill area and they are--

the ones you saw in the newspaper that got all the way around the country, that was the I-10 canal.

MR. TRAINA: I know this conference has gone on record, again for the record, Mr. Chairman, and I guess we do have a requirement, that there is no construction dredging in Mulatto Bayou. This is a problem we have long recognized with regard to dredging in Mulatto Bayou, and I assume since this conference there hasn't been any dredging in Mulatto Bayou. Is that correct?

DR. HOPKINS: Well--

MR. TRAINA: It is the requirement of this conference.

DR. HOPKINS: There was maintenance dredging, and that is the DOT project. I have fought it tooth and nail and, quite frankly, lost a few pieces of my hide, but there was maintenance dredging.

MR. TRAINA: The recommendation was specifically construction dredging. I assume, then, you are saying--well, I assume; you just said it--that there should be no dredging, period?

DR. HOPKINS: In my opinion, Mr. Traina, they did not maintenance dredge in 1970. I can show you, I think, that when you plow through an island full of grass, that isn't maintenance dredging.

MR. TRAINA: You feel, then, there has been a violation of the recommendations of this conference?

DR. HOPKINS: I have always felt that, sir.

MR. LEVIN: Can I ask a question?

MR. WHITE: Sure.

DR. HOPKINS: And I have slides to demonstrate the dredge going through the grass islands.

MR. WHITE: Before I do, let me ask our reporter how she is doing.

Let's go off the record a second.

(Off the record.)

MR. WHITE: Back on the record.

Let's take a 10-minute recess and we will come back with Dr. Hopkins after the recess.

(RECESS)

MR. WHITE: Let's go back in session.

It looks as though we have another three hours to go on the program. I would like to proceed now, I mean finish up with Dr. Hopkins, and proceed and see if we go anywhere near the schedule that we have outlined. If possible, we would like to finish it today, but I am thinking we won't and it looks as though we might have to break at about 6 and come back in the morning to hear the additional testimony and then go into executive session and come up with the conclusions and recommendations then.

We will make a definite decision by 5 o'clock, but it looks like we will be back in the morning on this.

Are there any of you who are here today who can't be here tomorrow?

O. K. Thank you.

If you would proceed, then.

DR. HOPKINS: I thought it might be helpful to show Mulat Bayou as it was some years back and perhaps we can get a better understanding of just how it has been changed in nature.

...Slides...

As I understand it, this is a USDA aerial photograph taken about 1949. At that time there was virtually no manmade activity in the area with the exception of the L&N trestle. The only activity that I can document is a group of pioneering gentlemen that took sticks of dynamite and tried to open up this canal through here (indicating), and I have talked to them and as best I can tell they were interested in taking skiffs from this area up in here (indicating), oystermen and so forth, and they used to drag their skiffs and they used to have to essentially carry them overland through this twisting, winding area here (indicating). They called this Redfish Bayou, historically, and they opened it up with some dynamite sometime just after World War II.

The next aerial photograph that we can find of record is this flight which was taken after the construction of I-10, and we can see the effects of development of several kinds. Incidentally, these canals open on Indian Bayou. It has been treated in much the same fashion with regard to real estate development.

If you look at the map carefully, you will find the ancient trail of Redfish Bayou twisting and winding right here (indicating). It was, in fact, sealed over by the construction of I-10 and in that process, as I understand it, the Department of Transportation was asked to leave this access open. This access was created so that they could take barges in to pump up spoil to create this area here. They left it open and then, of course, that left it open to the real estate developer who came along and constructed this area here.

Then we have other photographs later on that show the dredging that took place. In an essence, it went through this grassy island right here and stretched around to there (indicating).

But this shows rather dramatically the effect of engineering on this particular geographic site.

Now, I should like to say for the record, because I am sure that in some ways by expressing my opinion to the conferees I have done something that Dr. Livingston was hesitant to do. Remember, it is my opinion. It is my opinion based on three or four years working in the area and it, of course, does not preclude the fact that after Dr. Livingston shows me all his data and we take all my data historically that I might not change. But as I said, much of what I am saying today is on record, I have been on record that way for two years, and I still don't see any information that really changes with regard to Mulatto Bayou.

With regard to the statements of 94 percent treatment, I would just like to clarify that what I was alluding to was the Federal conferees of 1969 with regard to their waste reduction and I believe they converted it to pounds, not percentages. I think that that is what I personally would hold to, Mr. Levin, rather than say out of the bay. Out of the bay is very nice, but it may be in terms of an optimization model we might be able to reach that without going that other all the way.

MR. LEVIN: Tom, how much of the previous studies that you have done along with members of our department and Dr.

Duke and the local staff, how much of that could you utilize in conducting this study that you want to make now in order to come up with some final recommendations?

DR. HOPKINS: I certainly don't know. Every scrap of information I have--and quite obviously some of it is, as I said, on the field data sheets--it certainly is available to any agency that would like copies of it. The problem is to put it in some tabulated form where it would be of use.

For example, all of our data for April, May and June is still on the original data sheets and has never been transcribed. We just don't have the--I don't have the--as somebody said, there is just one of me and that is about the way it stood. Kids go off the job and I have got other things to do.

With regard to Mulat, I think that all of the data, to be specific, all of the data we have been able to generate through the old Bureau of Commercial Fisheries contract will be fed into the decision that Dr. Livingston and I ultimately make. We hope that the information I have will corroborate his findings.

MR. LEVIN: How about the other bayous, Judges Bayou?

DR. HOPKINS: Judges Bayou is a peculiar situation. It is located right here (indicating) just north of Fishermen's Point. I have never really looked at it, but as you know, being here, it is very close to the industrial sites. One could suspect that perhaps leaching from the industrial sites through groundwater enters Judges Bayou and has caused its eutrophication. That is absolutely conjecture because I have only taken a few water samples in there and that was during the fish kill.

MR. LEVIN: Getting back to Mr. Traina's idea of some stopgap remedies until we can come up with some more permanent things, these bayous, is there any way that you could utilize these air curtains, so to speak?

DR. HOPKINS: No, I think that we pretty well exhausted this at the menhaden conference. If you put in one air current some place, somebody else who is having problems is going to virtually demand one and they have a right to it, because we cannot predict in how many places. We had fish kills that just ring the bay and now in Gulf Breeze too, so that the cost would be prohibitive. And then maintaining them is just impossible. Even if you wanted them, I am not sure you could get that many compressors if you ordered them today logistically.

I just don't think air curtains are a solution. I wish they were. Functionally they work fine as a nice theoretical solution.

As Tom told you, we did observe that they did hold the fish out, but we also observed, and the fruit of it is in that picture again that got spread around this year, actually that picture is a year old, with the marine patrolman standing in the boat, that fish kill occurred in that canal when the compressor broke.

MR. LEVIN: Let me ask you about the using of the other river, the White River.

DR. HOPKINS: Yes, sir.

MR. LEVIN: How much of a problem are we talking about there insofar as getting that body of water moving?

DR. HOPKINS: Mr. Levin, I am not an engineer and I believe that this is the point where our people in the Corps of Engineers could be of a great deal of help in terms of looking at hydrographic flow and changing it, but I measured on the map and at one point there is no more than 1,000 yards that would have to be opened up on a straight shot to carry into one river, and I think it was about the same on the other. But again I think that this is in the realm of the hydrographer to look at.

I personally feel it would help. I think it would improve the water quality from the standpoint of breaking down the stagnation that occurs on the axis of Simpson River and

White River, Thompson's Bayou, which we did see this summer.

MR. LEVIN: But as far as getting ready for this coming summer, the best you can see is trying to get that problem straightened out in Mulatto Bayou and that is about all we can do for right now?

DR. HOPKINS: Well, I don't think engineeringwise that it would take all that long to make some sort of decision about cutting through. I mean if you are asking me point blank could this be done before summer, I would imagine so. It is only 1,000 yards. And with the right engineering study and know-how that the Corps of Engineers possess, it would seem to me that they could give us an answer with regard to time and cost very quickly.

MR. LEVIN: What about the possibilities of other nutrients coming down that body of water into Escambia Bay?

DR. HOPKINS: I don't know how much information exists on the White River. In 1969 I took nutrient data from the White River and the only thing I looked at at that time was nitrate and they were not exceedingly high. There is no hot water. I did not do total organic carbon.

But just offhand I would suspect that the White River does not carry a high nutrient load of total organic carbon, of artificial total organic carbon,as opposed to natural.

MR. TRAINA: Tom, a question getting back to this 94 percent, because I think perhaps the way it came out earlier may not be the way you want it to come out.

You are saying that you are really not too sure at this point, Tom, whether we should have complete removal from the bay? You are not saying that you feel that this bay can take more nutrients or continued amount of nutrients, are you?

DR. HOPKINS: No. No, I am saying that--I guess in a way--I don't want to use that. I guess what I am saying is that I am not convinced that 100 percent removal is absolutely necessary. I realize it would be the best thing in the world for the bay, but it is sort of like asking yourself what can I achieve versus what would I like to achieve. And as a biologist seeing this bay over time, if I felt that we could achieve the recommendations set by the original conference, we would be a milestone ahead while we then gathered the necessary steps and necessary information to see what more we should put into it.

But I would really hate, not knowing--not knowing--I would really hate to see more dollars spent, which, as I said, in an optimization model would be over the curve and would just be spent needlessly. And there are all kinds of papers in the journals now about optimization models on rivers, and so forth, up in New York, showing that you achieve this much removal for this amount of dollars and after that for every one percent over that you are spending more dollars than you are getting benefit.

MR. TRAINA: Of course this conference has not recommended this total removal from the bay, although it was suggested as an alternative.

DR. HOPKINS: No, it was a question, and I am answering in my personal opinion, certainly not as an engineer, and some people may disclaim me as a biologist after this.

MR. TRAINA: With regard to Mulatto Bayou, again I keep going back to this because summer is coming up quickly.

DR. HOPKINS: Yes, sir.

MR. TRAINA: To your knowledge, are there any other activities in terms of dredging being considered between now and the summer?

DR. HOPKINS: No. The only other dredging activity that I have noticed, that there is clamshell dredging up by the State road bridge and this is done by a real estate developer where he is cutting a canal into his property, and I questioned that before and in essence it just goes on. But he had a dip-type dredge and I can show you--well, I can show you on this over here, if you like.

...Slides...

This went on about a year ago and it is a source of a great deal of sedimentation. In fact, I feel like--you see this right here (indicating), Mr. Traina, this is an artificial canal, and I personally feel that this very buildup of sediment in here (indicating) may very well be a result of this right here (indicating), because when it rains this literally bleeds and I feel like it is sediment that has created this bar that you see in here (indicating), although I have no real proof. I can't suggest any other way it came about.

MR. TRAINA: These are, quote, maintenance dredging projects?

DR. HOPKINS: Well--O. K. I don't know, because I have never been able to determine. And Mr. Wagner came down at the eleventh hour with regard to that canal and we just fought a valiant effort and lost, because I think Mr. Wagner agreed that it was not going to be maintenance dredging that they had proposed.

MR. TRAINA: Who within the State is the one--a permit is needed to do this?

DR. HOPKINS: Oh, the permit was already issued. That was the whole problem.

MR. TRAINA: I see.

DR. HOPKINS: And I just started the battle too late. I mean it is just one of those things.

MR. LEVIN: I am going to check. We are going to check right away to see how many of these permits. We have instructions that there be no more permits on this body of water, so as to when these permits, if in fact they were issued-- if they weren't issued, we can do something right away.

MR. TRAINA: Apparently, you know, I guess everyone has decided on construction permits, but I think what Dr. Hopkins is saying is that perhaps there have been some problems associated with maintenance dredging which this conference does not have the specific recommendation on, although I believe we did recommend that those projects be reviewed by the group, but with regard to construction dredging there be no construction dredging at all. Apparently we have got a problem here which I think needs to be checked.

DR. HOPKINS: I think you have a problem with maintenance dredging. I think that a lot of people are carrying on unnecessary activity under the guise of maintenance dredging and I think that all dredging activities of any kind in the basin itself should be looked at with a very jaundiced eye until more is known about the effects on the system.

MR. TRAINA: Thank you.

MR. CROCKETT: Question.

MR. WHITE: Mr. Crockett.

MR. CROCKETT: Dr. Hopkins, going back to your discussion of a connection of White River to the upper end of the bay, in effect the White River is simply a split-off of the Escambia--

DR. HOPKINS: Yes, sir, it surrounds Brosnaham Island.

MR. CROCKETT: So you wouldn't be too concerned about bringing that Escambia River water into the bay, you wouldn't be too concerned with the nutrient load that is not just now in there?

DR. HOPKINS: I am not sure I follow you. You talked about the White and then referred to the Escambia.

MR. CROCKETT: Well, the White, if you obstructed the White, you would in a sense be diverting part of the Escambia River, would you not?

DR. HOPKINS: Well, I am not going to obstruct the White. The White would still come on down by--I would divert some of the flow.

MR. CROCKETT: But it would be going into this area of the bay where you have had most of your troubles, correct?

DR. HOPKINS: Yes, sir.

MR. CROCKETT: I will get down to the point of my question.

DR. HOPKINS: O. K.

MR. CROCKETT: I believe you have done some biological work on the river, let's say upstream from Monsanto, around State Highway 184, you have done some studies--

DR. HOPKINS: Highway 4.

MR. CROCKETT: What?

DR. HOPKINS: Highway 4.

MR. CROCKETT: Highway 4, you went up as high as Highway 4. Do you have any comments, I think I have heard you make comments in the past, on what you found in the way of biota and would--

DR. HOPKINS: No, sir, I don't believe I have.

MR. CROCKETT: You have no information on the biology of the stream?

DR. HOPKINS: I am not sure I know what report you are referring to. In 1969 I did a study approximately a month long on the river and a month on the bay, and in the river we only looked at water chemistry and temperature, nitrate, salinity, temperature, dissolved oxygen. We did not do any biological studies.

In November of this year we were funded by Humble

Oil Corporation to do an impact study at the site of the Humble pipeline crossing just south of Highway 4.

MR. CROCKETT: Maybe that is the one I had reference to.

DR. HOPKINS: So we haven't written any up yet, but at the present time in conjunction with the Bream Fishermen's Association we are conducting monthly shockings and fish tagging exercises, we are putting out plates for periphyton development, and we are also looking at new growth and vegetation from the standpoint of, one, baseline data in the area and baseline to compare it if we had a world catastrophe, which all of us do not believe will happen. But we hope to be able to provide the conferees with quarterly reports as we develop them.

MR. CROCKETT: Let me go back to the question I was trying to make in a roundabout fashion earlier and ask you of your opinion as to the contribution--let's go back to the Conecuh River and to the problem we are now having in Escambia Bay.

DR. HOPKINS: I do not have any personal knowledge with regard to water quality as it is affected by the Conecuh River. I have never, for example, looked at 5-day BOD's or total organic carbon. We don't have that capability right now.

I am hoping to get a carbon analyzer.

The only data that we had two years ago was on nitrate levels in the river and at that time I pointed out that from the limited sampling we did the Escambia River at the head of Brosnaham Island, which was Ruth Patrick's, it duplicated Ruth Patrick's original station, some stations in the White River, the nitrate levels in that river were no more than they were during the 1952-1954 survey of Ruth Patrick.That dealt just with nitrates.

MR. CROCKETT: John, I have no more.

MR. WHITE: Any other comments or questions?

MR. RAVAN: Just a question here.

DR. HOPKINS: Yes, sir.

MR. RAVAN: Just for the record and to be absolutely clear, the White River is a tributary of the Escambia River?

DR. HOPKINS: It splits off of the Escambia River. Here it is right here (indicating) and it splits off and joins back and isolates a large island called Brosnaham Island.

MR. RAVAN: Is it your opinion, Doctor, that the water quality in the White River is better, worse, or the same as?

DR. HOPKINS: It is better.

MR. RAVAN: It is better than Escambia?

DR. HOPKINS: Yes, sir.

MR. RAVAN: To what do you attribute this?

DR. HOPKINS: There is no industrial outfall that goes into it.

MR. RAVAN: And about how long is the White River?

DR. HOPKINS: I have those figures. I can't pull them out of my head right now. Several miles. It is very twisty, windy, and I am equating several miles in river miles.

MR. RAVAN: Thank you.

MR. MAURIELLO: Tom.

DR. HOPKINS: Yes, sir.

MR. MAURIELLO: Clarify the point when you say that the water quality of the White River is better than the Escambia. The Escambia at what point?

DR. HOPKINS: At a point below the location of a major industry.

MR. MAURIELLO: O. K.

DR. HOPKINS: The Monsanto Corporation.

MR. MAURIELLO: How about the water quality of the White River above the point source in, say, Florida? Is the White River--

DR. HOPKINS: I don't know--

MR. MAURIELLO: It is the same as--you consider it the same as the Escambia River, then, at Highway 4?

DR. HOPKINS: Yes, sir, I believe so. I believe I could make that statement. Although I should say that during that same period I did not take water samples at Highway 4, but I would assume from all that I can see that there should be no significant difference.

MR. MAURIELLO: Well, your recommendation of connecting the White River into the upper end of Escambia Bay is based primarily, then, on the hydrological effects. Does it include all of the water quality that may have an effect on that area? Such things as nitrates, phosphates--

DR. HOPKINS: Yes, sir.

MR. MAURIELLO: --carbons?

DR. HOPKINS: Yes, sir.

MR. MAURIELLO: And those additions that may--

DR. HOPKINS: Yes, sir.

MR. MAURIELLO: --or may not be in?

DR. HOPKINS: Yes, sir. Because bear in mind that whether you set it through there to there or whether you set it down there, it is still going to end up in the same place, Gil. We are still talking about ultimately ending up at the same place. And I am only hoping that this will restore this major marsh area up here so that we get rid of the stagnant water, that menhaden don't go up there and die and kill all the kinds of fish that everybody wants to fish for. I don't fish so I don't--

MR. MAURIELLO: What you are saying, then, is that it is going to increase the flushing activity or the hydrological effect of that area?

DR. HOPKINS: Yes, sir, I would believe it would do that.

MR. TRAINA: Tom, just so I don't become confused, I thought I understood, perhaps I don't. The White River gets water from the Escambia River, does it not?

DR. HOPKINS: Yes, sir.

MR. TRAINA: So the water quality of the White River is the same as the water quality of the Escambia River?

DR. HOPKINS: North of the major industry.

MR. TRAINA: North of the major industry.

DR. HOPKINS: I think we would have to say that, with no derogatory remarks intended. We know that the temperature changes and that there is a certain amount of--

MR. TRAINA: Yes, right. So, therefore, you know, you are just taking, really, Escambia River water coming from upstream and putting it in a different place in the bay to take advantage of its flushing capabilities?

DR. HOPKINS: Almost. I don't want to hedge, but there is additional natural drainage coming into the White at various points that may add--

MR. TRAINA: Essentially it is Escambia River water?

DR. HOPKINS: Yes, sir, essentially it is Escambia River water.

MR. WHITE: Any other comments?

If not, thank you very much, Dr. Hopkins.

DR. HOPKINS: Yes, sir.

MR. WHITE: I think you have given us quite a bit of food for thought.

Let's go off the record for just a second.

(Off the record.)

MR. WHITE: Let's go back on the record, then.

Mr. Mauriello, if you will proceed.

MR. MAURIELLO: I would like to ask is Commander Hunsley or any representative from the Woodlawn Civic Association here?

MRS. GUICE: There are a couple of us here, but Mr. Hunsley isn't here.

MR. MAURIELLO: Is he going to be here, do you know?

MRS. GUICE: I can have him here tomorrow if you would like to have him.

MR. MAURIELLO: I think the conferees would have an interest in that Woodlawn project.

MRS. GUICE: All right.

MR. WHITE: Excuse me, we don't normally do this. Would you identify yourself, ma'am? And we won't depart this much from our procedure any more.

MRS. GUICE: I am Mrs. John J. Guice.

MR. WHITE: Fine. But from now on let's confine our comments at the lectern.

MR. MAURIELLO: Mr. Tom Carey of Air Products has indicated that he would like to speak. Is he still here?

MR. CAREY: Yes.

T. L. CAREY, VICE PRESIDENT
AIR PRODUCTS AND CHEMICALS
PENSACOLA, FLORIDA

MR. CAREY: Mr. Chairman, conferees, ladies and gentlemen.

I am T. L. Carey, Vice President of Air Products and Chemicals.

I am pleased to have this opportunity to report to the conference the results and current status of our pollution control efforts.

To avoid any misunderstanding, what was the Escambia

Chemical Corporation has now been merged into Air Products and Chemicals, Inc., and this plant is known as the Escambia Plant of Air Products.

You will recall that the FWQA report issued at the first conference on January 30, 1970, noted that the Escambia Plant effluent contributed only 1 percent of the 5-day BOD and total organic carbon discharged in the study area. The report also noted that under the heading of "Toxic Wastes" that "no compound in the Escambia effluent had concentrations greater than 5 mg/l". At that conference, we further pointed out that our effluent had an average pH of 7.2, essentially neutral, and that it contained essentially no settleable solids. Dissolved oxygen in the effluent has always been equal to or greater than the receiving waters of the bay. At the second of these conferences, in February 1971, Mr. J. D. Kramer, our Technical Manager, reported on our progress to that time and outlined a continuing program.

The past year has seen further significant reductions in the effluent as a result of the completion of several major plant projects and the continuation and expansion of our In-Plant Source Control, Water Conservation and Reuse Programs.

The following details the progress to date of the Escambia Plant Abatement Program. Results of these are clearly set forth in the following tables. And we put this in the record, but in effect what we show is the levels of water, COD, nitrogen, phosphate at the various times, and it shows that our COD removal is now at 96 percent, our nitrogen at 81 percent, and our phosphorus removal at 83 percent. Phosphorus, incidentally, is 55 pounds per day. It is hard to find much less than that.

Nitrogen removal is the remaining problem in the Escambia Plant effluent. Our programs are to continue with the highest priority towards the removal of these materials. The technology of removal from dilute streams is not well advanced, it is pointed out by the Advanced Waste Treatment Laboratory of the EPA in their report of May 20, 1970, entitled "Nitrogen Removal from Wastewater." To date, the Escambia Plant's program of source-control, flow reduction by recycling, and biological treatment has been effective, and we feel, based on the results to date, promises to provide for even further removal of the nutrient nitrogen. We anticipate a 90 percent removal from the base levels by January 1, 1973.

Since the first joint Federal-State conference, the Escambia Plant has installed many new pollution control facilities at a cost of over $1 million, requiring an operational expenditure of $0.25 million annually. A summary of the major facilities follows:

First, the expansion of our facultative stabilization ponds.

We originally had a small three-acre pond just ahead of our effluent measuring weir at the discharge point. Dr. James B. Lackey, formerly Professor of Sanitary Science of the University of Florida and now Professor Emeritus of Bio-environmental Engineering at the University, made extensive biological studies of the pond. He found a well-balanced biota to exist the year round with a significant uptake of phosphorus and nitrogen. The quality of the effluent in this pond was such that we stocked and maintained an abundant fish life.

On the basis of these findings, the original three-acre pond was expanded to three biological ponds totaling some 60 acres at a cost of approximately $400,000. All of the Escambia Plant effluent water and surface water drainage passes through these ponds before entering the bay. Each of the ponds has a concrete spillway provided with a 20-foot weir for measurement. Also as a part of the pond project are three aerated terraces--one to each pond discharge point.

The expanded biological pond system is only a few months old, but now generates the lowest nitrogen figures we have had. While final stabilization of these ponds is projected by Dr. Lackey to require several months, they presently support the growth of a vast flora and fauna. In fact, wild birds and ducks have populated the ponds ever since they were initially flooded in March,1971, and we have now stocked several hundred fish of various species.

Second, chemical treatment facility.

Construction of this $100,000 facility was completed in May, 1971, to treat wastewaters from the polyvinyl chloride and nitric acid plants. The waters are treated in a neutralizer with magnesium oxide, which simultaneously chemically precipitates the phosphates and neutralizes the wastewater. The wastewater is then transferred to a holding pond where the solids are settled, pH stabilized, and wastewater biologically polished. The water overflows this pond through a paved ditch to the previously mentioned biological pond system.

3, neutralization facilities.

Another plant wastewater stream is passed through an automatic neutralizer and pH control. The neutralized effluent is discharged to an intermediate retention pond for stabilization. This pond contains some 3.3 million gallons capacity and discharges to the biological ponds for further treatment. This system was installed in May, 1971, at a cost of about $75,000.

In November 1971, at a cost of $0.25 million, our fifth biological pond was completed and placed in service. The purpose of this pond is to provide additional biological treatment for selected low-volume streams. This pond, with a capacity of about 25 million gallons, provides five to six months treatment time for these selected streams. With this pond, the Escambia Plant now has a total treatment system capacity of 100 million gallons.

5. Reduction in volume of effluent flow by recycle and in-plant control programs.

a. Methanol plant water reuse facilities. New equipment was provided in the modernization program in the Escambia Methanol Plant to permit the reuse of the total process water streams. This was completed in June, 1971.

b. Ammonia plant water reuse recovery facilities. In February, 1971, some 1.5 million gallons of water per day were removed from the effluent by installing new facilities to reuse once-through cooling water and to recover process condensate.

c. A number of other smaller projects to this end have been completed, making in all a total reduction of nearly 4.5 million gallons of effluent per day since 1970.

6. Excess run-off control devices.

T. L. Carey

All of the run-off waters as well as the in-plant streams are taken into the plant biological pond system. In November flood gates were installed at each pond to prevent sudden surges of flow due to heavy rains and permit a more orderly discharge of this runoff. In connection with these improvements, we have extensive monitoring and automatic sampling equipment. The 350 samples generated per month by the program undergo some 2,900 assays. The resulting data are coordinated and organized on our computer with immediate printout and updating. These data are routinely reported to the State.

Coupled with the routine program are special programs, such as work done by Dr. James B. Lackey and our staff in the Escambia and Blackwater Bays. We exchange samples for comparison of analytical precision and accuracy with governmental, industrial, as well as independent laboratories. We are now actively engaged with the Audubon Society to establish a wild bird sanctuary at the biological treatment pond area. We feel that by the establishment of such a sanctuary, wildlife clubs as well as the interested public would have an excellent opportunity to observe our local birds in their natural habitat.

I would now like to direct your attention to the slide presentation of Mr. Roy Duggan, our environmental engineer, who will show you some of the things which we have discussed.

MR. WHITE: If I might interject something here, do you have copies of these slides to present for the record?

MR. CAREY: I don't think so.

MR. DUGGAN: We can have them within 30 days.

MR. CAREY: We can make them.

MR. WHITE: If you would and submit them within 30 days, I would appreciate it.

MR. TRAINA: They aren't color, are they?

MR. DUGGAN: Yes, sir.

MR. WHITE: They won't appear in color in any reproduction.

MR. CAREY: All right. We will be pleased to do that.

MR. WHITE: All right.

MR. CAREY: After Roy's presentation I just have a few concluding remarks.

MR. WHITE: Fine.

ROY DUGGAN, ENVIRONMENTAL ENGINEER
AIR PRODUCTS AND CHEMICALS
PENSACOLA, FLORIDA

MR. DUGGAN: I am going to show you what Tom left out here first.

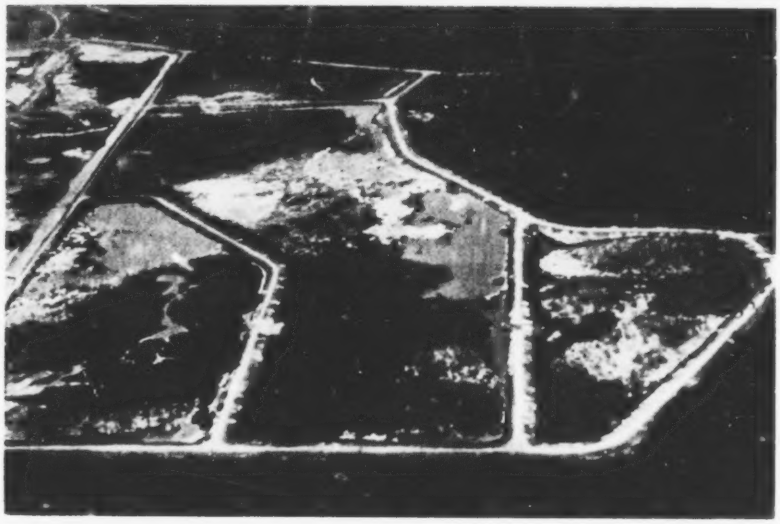
O. K., I am going to real quickly, since we are pressed for time and the conferees and everyone has had a long busy day, run through slides of what Mr. Carey has just verbally presented to you as far as the Escambia Plant status.

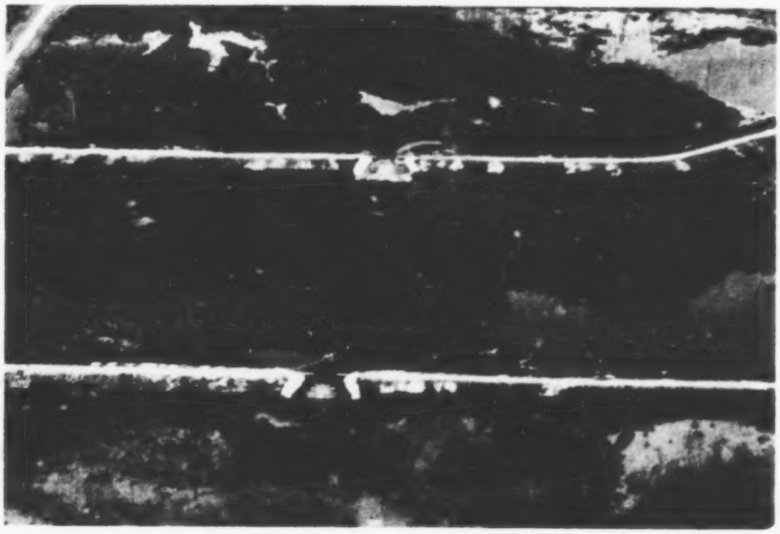
...Slides...

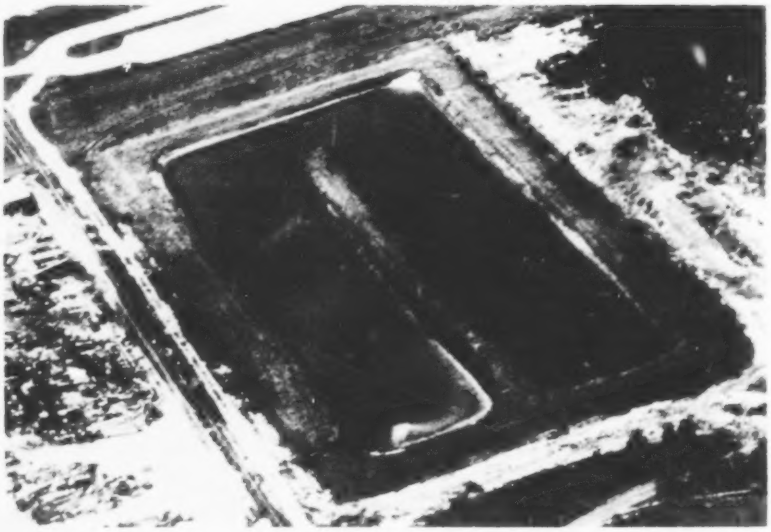
This is the sign at the beginning of our roadway and we will real quickly run through an orientation.

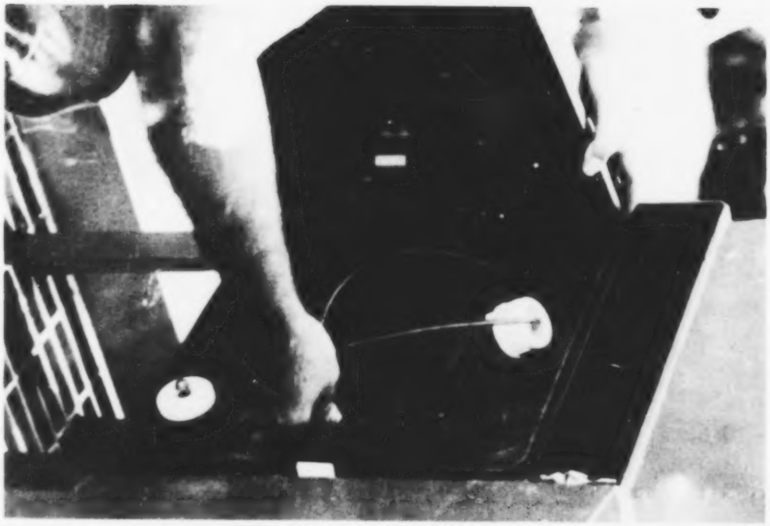
This is an aerial shot of some 1,600 acres that we occupy out there and it fronts Highway 90 as well as the Escambia Bay area. It has two main manufacturing areas known as Area A up here (indicating) and Area B (indicating). It is a multi-petrochemical base type chemical,manufacturing bulk intermediates primarily, and we compete with people like Dow, duPont, Allied, Carbide, Monsanto, et cetera, in the various product areas. As Mr. Carey pointed out, we have had a major expansion of the biological ponding system. This is an overlay of the area south of Area B between our last manufacturing facilities and the bay. This was presented to the Board of

Air Products and Chemicals INC.
ESCAMBIA PLANT









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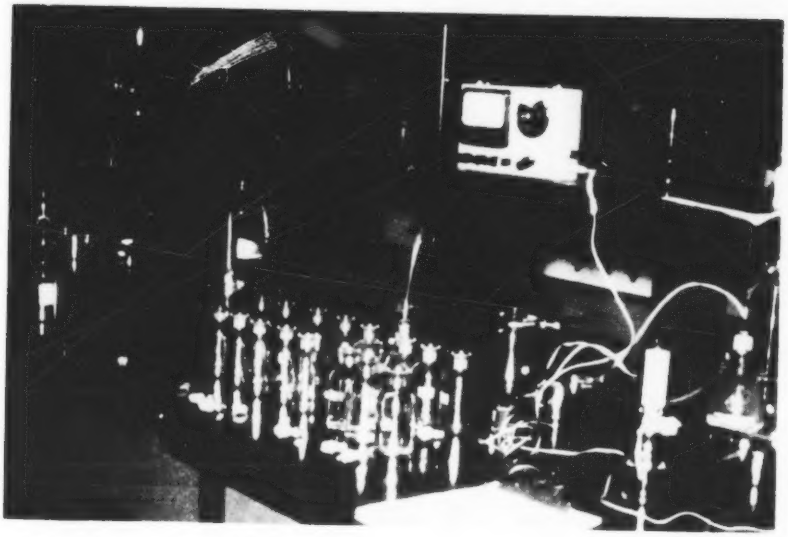

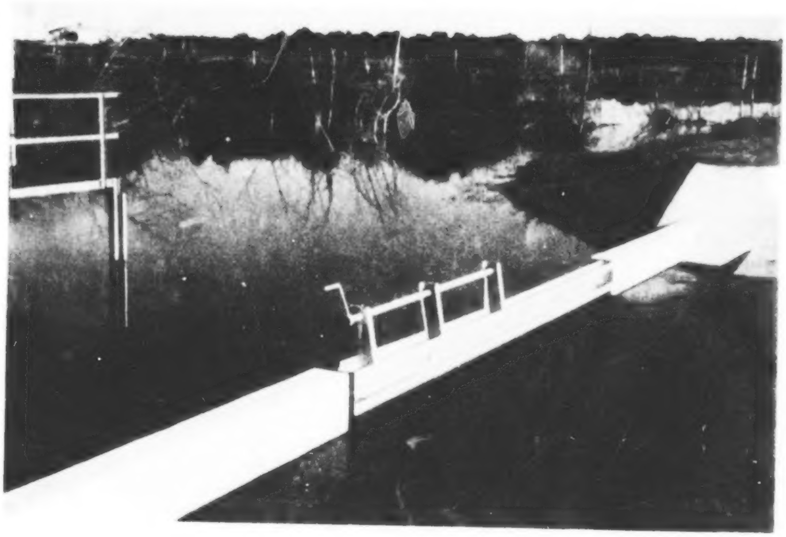

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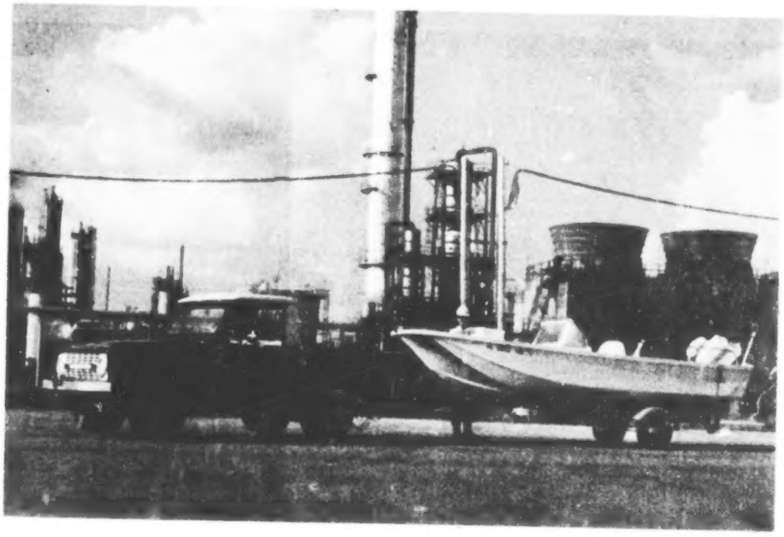

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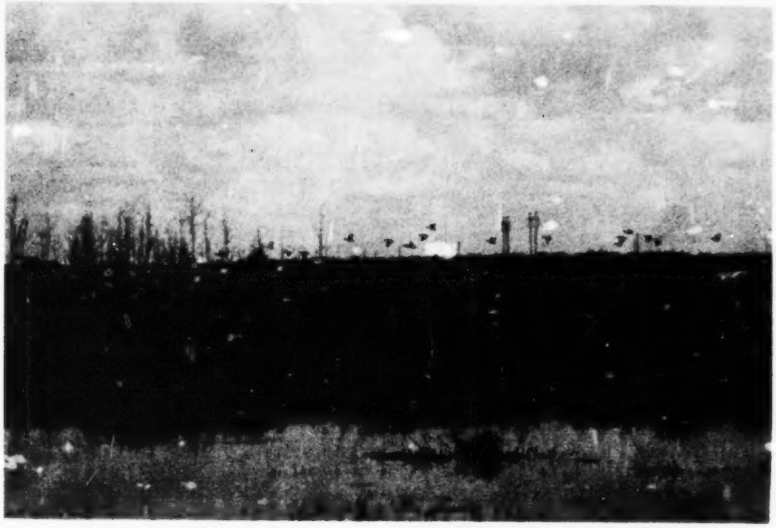

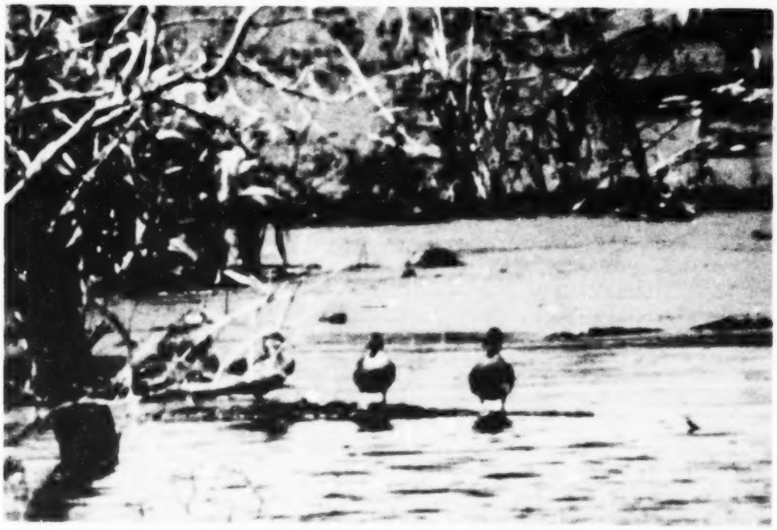

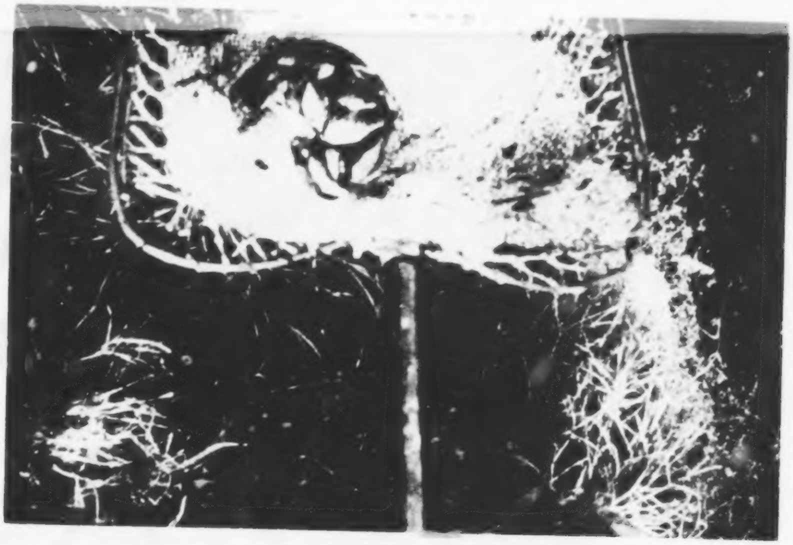

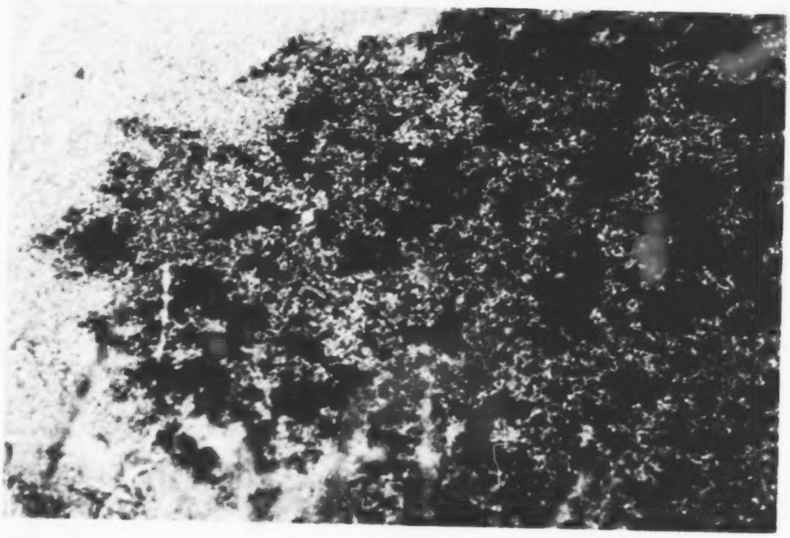

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Directors, also presented to the State, approved and passed. Construction began and we moved some 300,000 yards of filth and to create a road system down in the natural lowland drainage area to better get increased retention time and increased biological treatment for our nitrogen effluent problem.

This is a shot pointing out the road base or the base of the dam for the new system as compared to the top of the dam for the original three-acre pond to just put the entire project in perspective.

We created and designed and built three spillways containing something like a couple of hundred yards of concrete and about $17,000 expense for spillway to measure, aerate, and sample and record the flow of this system.

This was the completed system as it looked in August. The water in the ponds or the lagoons, if you wish to call them that, is shallow. It is about six feet deep at the spillways and the green vegetation that you see is actually floating on top of the water. The light green is a weed that floats on the top, it is a little trilobular plant that is called duckweed. The other dark green flora is just a whole host of typical southland vegetation.

This is a low elevation aerial shot of the spillways and ponds. From time to time we go in with a clamshell and clamshell out these floating vegetation masses and compost them for natural recycle.

This is a shot of our last pond, three ponds in a series, prior to discharging through the original lowland area into the peripheral shoreline of the bay.

This is what the water looks like going over the last spillway and there is a considerable community of filamentous diatoms here as recorded in Dr. Lackey's work for the last two years. You also can see the sampling platform, spillway and the 20-foot rectangular contracted weir right in this area (indicating) that allows us to record the flow of the water that we discharge to the bay.

Flow devices have been placed in service to minimize surges as a result of natural lowland and rain runoff.

This is a closeup shot of a flow recorder and sample recorder that worked 24 hours around the clock. We will have a detailed shot of it later.

This is part of the treatment system that was designed, constructed and installed and is operating at 90 percent-plus treatment efficiency on our polyvinyl chloride and nitric acid waste streams. It is a magnesium oxide slurry chemical treatment prior to biological treatment. We buy magnesium oxide from Basic Magnesia down at Panama City. pH adjust, precipitate phosphates, and then go ahead to biologically treat in this pond.

Here is a low level shot showing you a closeup of the lagoon.

We have been so delighted at the response and the treatment generated in the original three ponds that Dr. Lackey's work and the chemical assay work going on enabled us to go to the Board of Directors and request a continuing project for the construction of this ecopond. This is the new large facility that Mr. Carey just detailed to you. It has just been put in service, it is filling up at this time, and recently to release the thing to the public, so to speak, we brought Roy Thigpen, who is an Audubon man from Mobile, over and he brought Dr. Wilson Gaillard with him, author of several Audubon books, and these gentlemen looked over our entire property with respect to the Audubon bird sanctuary that we are now working on.

Mr. Carey pointed out several samplers and this type of thing that have been ongoing for quite sometime. We have several types of samplers and we will show you two of the basic types here. We have many of these.

This is a composite sampler here. It takes a 2-1/2 gallon composite over any period selected, 24 hours a day down to an hour, and you also can select your sampling frequency.

One sample every five minutes, one every 25 minutes, one every hour, this type of thing.

We also have two standard U. S. Weather Bureau rain gauges on our property as rainfall plays a significant part in the entire problem of the 3,800 square mile estuary as has been pointed out by several people already today.

This is a specific sampler that we utilize on the last two biological ponds prior to discharge to the bay. It has 24 separate bottles, one bottle fills per hour, so that at the end of a 24-hour cycle the 24 bottles are manually proportioned according to the flow reported, experienced at that time of discharge, so that our sample is probably as representative as we could get it.

We have considerable analytical capability, as Mr. Carey pointed out, better than some 350 samples a month with just right at 3,000 assays per month for the routine situations. Here is some DO and biological oxygen demand equipment that you have heard a lot about today.

Here is the ammonia and total Kjeldahl nitrogen apparatus that you have heard, ammonia nitrogen, TKN nitrogen, mentioned before.

We have an atomic absorption spec on the plant property and have had for years and run quite an extensive array of heavy metal analyses and have for quite sometime.

All of this data, all of this sampling,is organized right here in the computer room at the Pace facility. It is updated every day. A printed sheet comes out and it is forwarded to me in the morning. We forward this to the State during regular intervals, as Mr. Carey has pointed out.

This is the rig that we work with on the estuary and all of you people who have been on the estuary, who have worked on it and live around it see us on there quite often. We have regular sample stations for chemical assay, for biological assay. We also do work in Blackwater Estuary and the biological assay is primarily performed by this grand old gent, Dr. James B. Lackey, who is 78 years old. He has worked with us now for about, oh, two and a half years or so and has developed quite an extensive background of data on the microbiotic community of the bay.

Now you are going to see some shots taken by Mr. Thigpen of the Audubon Society, just proving and pointing out one of the most amazing side benefits that we have seen. We just have been really gratified at the wildlife and duck populations that have moved into our biological ponding area.

This is a flight of bluewing teal there that came in and spent some time with us.

This is the duckweed that I pointed out that floated on the water that the ducks feed on. It is part of the food chain system.

This is a couple of shots of the fish stocking that we did with the small bream back in mid-November on our last two ponds.

Now, there has been a lot of talk about the bayous, about the orientation, and everything, and at times I wished you could have had this slide up here,because you can see the Simpson River in here (indicating), the White River (indicating), the Saultsman Bayou (indicating), the Escambia River (indicating), the Sullivans Ditch here (indicating), it is all right there, and as you can see,that delta is sedimentation in its best form. That is what forms those deltas. You can see the hook created here (indicating), as Tom Hopkins referred to, as in times past the flows primarily could have been or should have been over here and has moved and probably due to a storm or something like this and created another delta or expanded the delta, if you so wish. You can also see the water reflection of our biological ponding area and this type of thing.

The bay is definitely imbalanced, it definitely has problems. We work on it every day, we all live here, I fish out there and I enjoy it. We want it very much to be in as best possible health as it can be.

This concludes my part of the slides of actually showing you what Mr. Carey has presented to you in verbal form, pictures that just can't be refuted. It is there, it is concrete. If you want to come see it, you can make arrangements and come see it. If any of you know any of the kids in the Woodland High biology club, they have been to see us; there have been quite a few citizens groups come to see us. It is out there, it is for real and it just hasn't all cropped up overnight.

I thank you for your patience and your time.

MR. WHITE: I think Mr. Levin has a question.

MR. LEVIN: Mr. Duggan, in your fish pond do you have any menhaden?

MR. DUGGAN: No, sir, that is a saltwater species; this is a freshwater pond, sir.

MR. LEVIN: So you don't know what effect the discharge has on the menhaden population?

MR. DUGGAN: No, sir, but I can assume that if we can get a diverse biota to exist in an undiluted state in our effluent ponds that we can have nothing but an extreme minimal effect on the receiving body of the estuary.

MR. LEVIN: All right. Now I have got one more question.

MR. DUGGAN: Yes, sir.

MR. LEVIN: Which do you think would be more attainable for your industry, to be completely out of the bay by January of 1973 or to meet the recommendations of this conference of two years ago that you have your discharged treated up to 94 percent?

MR. DUGGAN: Well, Mr. Levin, the statistics reported to you are from a program aimed at obtaining the goals generated better than two years ago, actually generated by your department back in 1969, so that we have been actively working on that and the goals are to obtain those values.

As far as total recycle, technically we are just not in a position right now to achieve that by 1973. As Mr. Carey pointed out, we have better than 75 percent reduction in flow since 1969, so we are 75 percent reduced volumewise now. So that our aim is in this area, our interests are in this area, but right now the technology is limited, and so that we cannot have a total recycle system, to the best of my personal knowledge, by January of 1973.

MR. LEVIN: What about the reduction of your--

MR. DUGGAN: Well, our goals are certainly to be there, sir.

MR. LEVIN: About 94 percent by January of 1973?

MR. DUGGAN: Well, right now we are at 83, 84 percent on nitrogen and this system is not a year old yet, and as Dr. Lackey, our retained biologist, tells us, it is still increasing in performance, as far as that goes. We are still working on source control and recycling within the plant, so that we are shooting towards that 90 percent type figure, yes, sir.

MR. LEVIN: Ninety or ninety-four?

MR. DUGGAN: Well, it depends upon what you--you can't talk percentages without getting into pounds per day, as Mr. Traina pointed out, so that we are shooting towards the pounds per day figure established by your department in 1969. The percentages depend upon what sort of figure you want to pick statistically.

MR. LEVIN: But right now you don't think it is technologically possible for you to be completely out of the bay by January 1973?

MR. DUGGAN: Not for our particular industry to the best of my personal knowledge, no, sir.

MR. LEVIN: I don't mean this to be ugly, but you say "not to the best of my knowledge." You see, this phrase keeps throwing me. I want to know is there somebody else in your industry that I can ask that can tell me?

MR. DUGGAN: We have got a whole host of expertise covered in all fields with considerable consultants retained. For instance, Black, Crow & Eidsness, water consultants, have been retained since the 1950's, so that when I say personally, I mean that is to the best of my knowledge after talking to all of these types of people.

For instance, subterranean injection could cease discharge to the bay, but how do you obtain 90 percent of pretreatment prior to subjection if we can't obtain it before we discharge to the bay? So that there are real serious engineering problems in this area.

MR. LEVIN: What about ponds or I should say pumping it backwards and getting some land that you can just throw it back up on the land, upstream, so to speak?

MR. DUGGAN: You can only irrigate, I believe is the term, or percolate water, as far as nutrients are concerned, to the tune of assimilative capacity of the crops or the living systems on that particular land. If you force feed it and put too many nutrients there, you will contaminate the shallow groundwater and then create a problem. This has been published in many studies and can be backed up by the USGS people out of the Gainesville-Jacksonville area, sir. So that you can percolate and you can spray irrigate, but the nutrients have to be assimilated in the crop and they have to be put into the food chain in order to be taken out of the problem.

MR. LEVIN: When will you be able to know just what you all will be able to achieve by January 1973?

MR. DUGGAN: Well, sir, we have submitted and did submit to you a final phase program on October 1, actually it was September 30 in the Gulf Breeze meeting, and pursuant to that we were ordered total abatement zero discharge, and have since filed for public hearing, so I assume that last technical report still covers our position as far as the timetable and how we are going to go about obtaining that particular treatment or load level to the bay, sir.

MR. LEVIN: And in the event you are unable to meet with the orders, then what?

MR. DUGGAN: Sir, I can tell you about the technical problems of what we are doing, but I can't prejudge what is going to happen at some time in the future if we don't do a couple of things. I just couldn't tell you that.

MR. LEVIN: To your knowledge, that hasn't been discussed?

MR. DUGGAN: No, sir.

MR. LEVIN: I have no further questions.

MR. WHITE: Mr. Traina.

MR. TRAINA: I have a few questions.

First, Mr. Carey, in your presentation you give these figures here for nitrogen. Is this a TKN figure?

MR. DUGGAN: No, sir, that is total N, sir, total N. It is TKN plus nitrate, sir.

MR. TRAINA: O. K.

MR. DUGGAN: All figures are as total N, total P, elemental.

MR. TRAINA: As I read these, and please follow through with me on this, because I may be misinterpreting, what you are saying is that you have reduced the flow in half generated by the plant and yet your pounds, relating it to material that was presented to us two years ago, is essentially the same or more?

MR. DUGGAN: No, sir.

MR. TRAINA: This is why I need to get some clarification.

MR. CAREY: Oh, I am sorry. Did I give you a copy of this?

MR. DUGGAN: They have a copy, sir.

MR. TRAINA: I have a copy of your statement here.

MR. CAREY: Which one is your problem?

MR. TRAINA: The nitrogen figure here.

MR. CAREY: Yes.

MR. TRAINA: You give it in, well, 15,000 pounds in 1969 and I take it now you are down to 2,900 pounds.

MR. CAREY: Yes.

MR. TRAINA: I was actually relating that figure to figures that were first presented to us in the Federal report back in 1970 which talked about 3,000 pounds, but they were talking about TKN. That is why I asked the question, you see. I was actually comparing the 3,000 pounds to the 2,900. I don't see a real substantial difference between the figures, but I may be comparing two different things.

MR. DUGGAN: It is apples and oranges, yes, sir.

MR. TRAINA: O. K. Do you know how that would relate, very quickly, back to TKN? How does this 2,900--

MR. DUGGAN: Statistically our nitrogen exists 50-50 as ammonia and nitrate with very little or zero organic, so if you double the TKN that should have been our approximate discharge statistically.

MR. TRAINA: All right, I see. About 6,000?

MR. DUGGAN: Yes, sir.

MR. TRAINA: With regard to these ponds, what is the mechanism involved there for removing nitrogen?

MR. DUGGAN: Establishing of the food chain, sir.

MR. TRAINA: How do you--I know it goes into the duckweeds, and so on.

MR. DUGGAN: Right.

MR. TRAINA: But then--

MR. CAREY: Into worms, into fishes, into everything. They eat it, as I understand it.

MR. TRAINA: You have to have a harvest, then, from these ponds, do you?

MR. DUGGAN: Yes, sir, and from time to time we clamshell off the weeds.

MR. CAREY: We have a harvest,but they also settle to the bottom and become stabilized in the bottom.

MR. DUGGAN: Yes, sir.

MR. TRAINA: Again, you fellows know your business here, but I would say that this kind of biological--

MR. CAREY: Biological business is not mine, I am afraid.

MR. TRAINA: --for nitrogen removal is difficult at best.

MR. CAREY: It is an extremely difficult thing.

MR. TRAINA: Have you considered chemical treatment for your nitrogen problems?

MR. DUGGAN: Yes, sir.

MR. TRAINA: Where have we gotten with that?

MR. DUGGAN: The volumes of water that we are talking about, like an anaerobic denitrification on carbon total with methanol and things like this is what you are talking about, sir?

MR. TRAINA: Yes.

MR. DUGGAN: The volumes at best, according to EPA reports, this has been pilot planted in small volumes but never put on large scale, and here again you are requiring denitrification bacteria to do the same type of thing here only in a much more confined community or ecosystem, so that it is much more difficult.

MR. TRAINA: Do you fully expect to get the 94 percent reduction of ammonia with the system?

MR. DUGGAN: This isn't the only thing that we are doing. For instance, source control was mentioned by Mr. Carey and there are many, many specific projects, engineering projects, a couple of changes in feed stocks or in designs to eliminate causes rather than treat effects, if you will, as far as logical philosophy on that.

MR. TRAINA: I am really concerned, because you know the plant here represents close to 50 percent of the source of nitrogen for the bay.

MR. CAREY: Into the bay? Excuse me. Into the bay?

MR. TRAINA: Yes.

MR. CAREY: I don't think that is right.

MR. DUGGAN: No, sir.

MR. CAREY: Excuse me.

MR. DUGGAN: No, sir.

MR. CAREY: Excuse me. We have very large nitrogen flows from the river into the bay.

MR. TRAINA: O. K., let me, for the record, clarify that.

The plant represents a significant source of nitrogen into the waters of the river and bay.

At any rate, I don't want to play with that, but my concern is that we are not--I wonder if we are really getting at this nitrogen problem with the system that is being developed here, and you say that you have checked the chemical removal but feel that you cannot project--

MR. DUGGAN: We are saying we are with chemical removal, ion exchange, and reverse osmosis and all these types of things. Believe me, we would much rather run a chemical operation than we would a biological operation, strictly because of the inherent problems that you point out, but so far the consultants and all the expertise in the field say it is extremely limiting as pointed out by an EPA funded grant in some work done at Tyler, Tennessee, with a corporation up there. They have gone to ion exchange, but they have got less than a million gallons of flow a day, sir.

MR. TRAINA: Well, I know you have said here that you are going to anticipate getting the reductions down by the 1973 date and I wish you well. I would hate, though, to come to that date and find that the system you have just hadn't made it. And other than just making this statement of cautioning you, or however you want to take that, I don't really know what else we can do. We can assume that you are going to get there, but I am telling you that to do it with a system like this for nitrogen removal--and again I would like to stress that, because I think Escambia or your new name represents a major source of nitrogen to the system and we need to really get that tied down.

MR. CAREY: Yes. What we are trying to convey are the things that we have done, the things that we are pursuing and now best know how to do and best are learning to do. And I think that it is my opinion that we will be able to approach the number that was recommended by the conference, the 94 percent. We started, of course, as you know, shooting for the 90, so it is all in the same line. However, in trying not to convey to you something that comes through rose-colored glasses, this last little bit is very difficult to get and it can cost extreme amounts of money or be totally impossible.

For example, we have talked about the river some today, but we have two or three thousand pounds of nitrogen a day, the river has thirty to sixty thousand normally and as much as five hundred thousand coming down per day into the bay. So maybe your problem, whoever owns the river up there, is 60 or 100 times worse than ours, but you certainly get the idea. It is a very difficult thing to do because--

MR. WHITE: I would like to interject the point here, though, your discharge, as was discussed with Dr. Hopkins a little earlier, is in an area of the bay that is not getting flushing and circulation, so you can't equate the two when we talk about the gravity of the harm that is done in the bay. And admittedly we might now have all of the technology or all of the studies done to show us just who is doing what, but you can't escape the fact, and you might as well say it, the discharge is poorly located in the upper end of the bay. I mean this is, of course, nothing--I mean there is nothing we can do about anything like this.

MR. RAVAN: I have a question.

MR. WHITE: Mr. Ravan has a question.

MR. RAVAN: With regard to this clamshell operation, skimming off the top, what did you say you did with that?

MR. DUGGAN: We compost it and then distribute it on the grounds of our property, sir.

MR. RAVAN: This has only been going on about a year?

MR. DUGGAN: Less than a year, sir. It was initiated in March of last year, sir.

I might point out that all of the technical or all of the chemical treatment systems that Mr. Traina referred to are specifically covered in a technical report submitted to the State, the final phase report on September 30, so if you would obtain a copy of that you can review all of the progress that we have had with the Department of Pollution Control in the State on all of these treatment methodologies up through the present day, sir.

MR. RAVAN: Thank you.

MR. TRAINA: Again, just one further question on this question of removal of nitrogen.

The conference, of course, and I understand that the State has followed this with an actual permit, gave you an allowable load of approximately 500 pounds a day and I guess this--I am having problems converting things. This was in total nitrogen. As I understand the figure you gave, this should convert in terms of total nitrogen to 1,500 pounds per day?

MR. DUGGAN: Yes, sir. At the time of the original conference, the Federal conferees were not aware of any treatment we were doing. The original conference reported the Escambia Plant, or Escambia Chemical then, as having zero treatment.

MR. TRAINA: Yes, sir.

MR. DUGGAN: This was discussed in a meeting in Atlanta and was agreed to that it was erroneous.

MR. TRAINA: Yes, sir.

MR. DUGGAN: And it was to be corrected, sir. So that is the problem with the statistics,which is why I referred to Mr. Levin's comment of percentages. It depends on percentage of what base load figure. The State has accepted our raw loads and our raw loads are as such and are from the State files out of Mr. Patton's office over his personal signature, sir.

MR. TRAINA: May I ask, Gil, what is the allowable load for Escambia Chemical in terms of total nitrogen?

MR. MAURIELLO: Paul, I think to clarify the thing we ought to be talking in terms of pounds and get away from this percentage figure.

MR. TRAINA: Yes, this is what I am saying. Right.

MR. MAURIELLO: This percentage figure is going to confuse things. We are talking somewhere in the range of 477 or 500 pounds. This is the ultimate goal that we are shooting for of pounds.

MR. TRAINA: Pounds per day in total nitrogen?

MR. MAURIELLO: Forget the percentages; it is going to throw everybody.

MR. TRAINA: As I understand the figure that was presented here relating to that, that is 1,500 pounds total nitrogen, approximately?

MR. DUGGAN: Right, 90 percent of the base load from Mr. Patton's office, I believe it is 1,510 pounds precisely.

MR. TRAINA: O. K. So you fellows--I don't want to come back here in November of 1972 and find that we are not even close. You fellows have got 1,500 pounds, you have to go down to 500 pounds, you understand that? I assume you do. And that is a significant way to go. It is just not the last 5 percent. That is a long way to go, from 1,500 pounds down to 500 pounds.

That was my only point. And I again would like to make the point, Mr. Chairman, I will conclude, is that the system that you have got going here may not make it. I hope it does, but I think you may--and I assume you are looking at other ways.

MR. CAREY: I think, depending on what number we are finally talking about, and there is some question about it, a number like 500 pounds probably is very, very, very difficult to obtain. I wouldn't like to mislead you on this.

MR. WHITE: Let me make one additional point here, and I don't want to get over in a different area too much.

But we have, as you know, the Refuse Act permit program and this is administered by the Atlanta Regional Office, and although it is bogged down in the court decisions, as many of you know, we nevertheless are going to be compelled to permit that at least based on this if not a stricter standard, and this is yet to be determined. I mean this is what we are here to decide today. So in no situation would it be less than that and that would be a part of any permit that would be issued by the Corps, we would recommend the Corps would issue in this particular case.

Turning just to a lighter point here, I notice there is no discussion about the phantom stream this time and I assume that--maybe you are not aware of this, but I assume the phantom stream has been sorted out and nullified?

MR. CAREY: It has been put into the totals and we just aren't talking about it or haven't talked about it.

MR. DUGGAN: It is in the total figure, sir.

MR. CAREY: It is in the total number of figures.

MR. WHITE: I don't care to explore it in any great depth, but that always intrigued me, this phantom stream. (Laughter.)

MR. CAREY: It intrigues everybody. But there are some groundwaters that do certain things and the numbers that you have today include total runoff; whatever comes is there.

MR. WHITE: Fine.

MR. CAREY: Now, I just have a little bit more.

MR. WHITE: Please proceed.

MR. TRAINA: Mr. Carey, just one other question. I am sorry.

MR. CAREY: You had that four times, but shoot. (Laughter.)

MR. TRAINA: O. K. You didn't have any BOD figures in here?

MR. CAREY: Well, we have COD, which is the thing that we think is probably better to measure. It is a relative kind of thing. We don't have total organic carbon either because it is less than 100 pounds.

MR. TRAINA: The conference put some recommendations with regard to BOD and phosphorus as well as nitrogen, that is the reason I asked you.

MR. CAREY: We are well under, aren't we, Roy? We have no problem. Ninety-six, ninety-eight percent.

MR. WHITE: Off the record just a minute.

(Off the record.)

MR. WHITE: Let's go back on the record.

Do you have another question, Mr. Traina?

MR. TRAINA: That is it.

MR. WHITE: Please proceed.

MR. CAREY: Thank you.

In conclusion, Air Products and the Escambia Plant will continue to be responsible and responsive with respect to environmental affairs and we are genuinely interested in continued improvement of our environmental impact in a manner that is consistent with good citizenship and with the effort of the total community.

The ecological problems of Escambia Bay are complex and incompletely understood. Unfortunately, the burdens of attempting to correct these problems have been thrust upon a political group of regulatory bodies who do not have the necessary resources to properly study the total situation nor the time to rationally define and resolve the problems in the face of an impatient public. Under the circumstances, it is not surprising that major industry, which represent discrete, visible, significant and relatively impersonal pollution sources, as well as an organized capability to do something concrete in reasonably short periods of time, becomes the first target. We in Air Products and Chemicals have understood this and accepted it and we do not quarrel with it now.

Such a procedure has its cost, however. Primarily it has caused industry to turn all of its effort inward, to find ways of reducing its own environmental impact to meet orders laid down by agencies forced to politicize their approaches. Very little has been done by industry to study the total problem because it has been continuously on the defensive, attempting to satisfy its critics, whether ill-founded or ill-informed or not. As long as our environmental impact was significant, this was in part appropriate.

Carrying this procedure to extremes, however, is very ill-advised. Air Products has now reached the point where its effluent contributes a relatively negligible amount of pollutants entering Escambia Bay each day. We believe that other industries in the area have similarly reduced their pollution loads to relatively insignificant amounts. In fact, Mr. deCastro of the Florida Pollution Control Board has stated in a previous public meeting of this type that complete shutdown of the industries located on the Escambia Bay would have no noticeable effect on the pollution problems of the bay as of this time. That statement coming from a public official is noteworthy and has not been given the attention it so richly merits. It does make it apparent that further restrictive legislation or regulation concerning industry effluent could cause significant economic dislocation of local industry and serious impacts for the community as a whole without producing any noticeable benefits to the community whatsoever.

Under these circumstances, it is time to assure that those regulations imposed upon local industry are consistent with the public interest and are within the bounds of what is economically and technologically acceptable and reasonable. Rather, we should now turn ourselves to the more adequate understanding of those factors that have a considerable impact on the bay and have not yet been brought under equivalent degrees of control. That there are many will be attested to by a reasonably objective technical observer of the real situation.

Further improvements in the ecological situation of Escambia Bay must be realized on the basis of a complete and realistic understanding of all the facts. To obtain those facts does represent a considerable amount of work, but it also implies the release of considerable amounts of data already collected which has not been brought out for public consideration of the problems of Escambia Bay. To the end of assuring a much more adequate understanding of these factors, we would like to make the following proposal for the consideration of the parties represented at this conference:

It has occurred to us that with the large number of industry and government groups doing work on the various factors affecting the bay, there must be much duplication of effort and, conversely, useful data produced by various groups are not being made available to help direct the efforts of others. In general, the result is much misdirected and wasted effort.

Furthermore, within these various groups is available a large pool of scientific talent covering many fields of expertise. Also within these groups are the technical abilities and the sophisticated analytical tools necessary to accurately analyze and develop the detailed data required to better understand the various factors at play in the ecological system of the Escambia and Pensacola Bay regions.

If we could bring all these talents to bear on a well planned, well thought-out program of study of this ecological system, surely more factual definition of the problems will result. Hopefully, then, truly constructive courses of action will be resolved upon in a fraction of the time it will take if we each go our own separate ways. To bring about such cooperation and to develop a comprehensive picture of the various factors affecting the ecology of the bay, we would like to propose the formation of a joint Industry-Government-Science Council to be composed of representatives of various groups such as:

EPA - Sabine Island Laboratory
Florida Department of Pollution Control
Florida Department of Health
Florida Department of Natural Resources
University of West Florida
U. S. Geological Survey
Air Products and Chemicals, Inc.
American Cyanamid Corporation
Monsanto
Gulf Power
And any others who would be appropriate.

We suggest that one or perhaps two representatives from each group meet to form the council and lay out a program and a plan of action. Various tasks and assignments would be made according to the abilities and capabilities of each participating group. The data so generated would be assembled into meaningful form and fitted into the overall program.

Frequent meetings should be held to study the data and discuss and decide the direction and nature of the ongoing data requirements.

It would appear to us to be appropriate for the council to periodically present their findings at these Federal-State pollution conferences.

For Air Products part, we are willing to make all of Dr. James B. Lackey's Escambia Bay studies available and to make his contracted-for services available to the council for consultation and to coordinate his future work. In addition, the analytical tools available at the Escambia Plant would be made known to the council and a significant amount of analytical and technician time would be set aside for the use of council-directed work. We also are prepared to make available technician time to do sampling in or around the bay as required and assigned by the council. We also would be prepared to provide some clerical and stenographic time and any other reasonable services that would help the cause.

Gentlemen, we would very much like to have your reaction to such a proposal.

That concludes my statement.

MR. WHITE: Thank you, Mr. Carey.

Are there comments or questions now?

MR. TRAINA: Mr. Carey, will you and your staff submit to us equivalent BOD figures in relation to COD?

MR. CAREY: Yes, insofar as we have them available.

MR. DUGGAN: We submit them.

MR. CAREY: We submit everything that is required, as far as I know.

MR. TRAINA: I would like to make one comment that doesn't have to be on the record, unless you want it, and I would like to make this to the Chair.

I cannot agree that the figures of 1,500 pounds of total nitrogen, 2,500 pounds of COD, and 55 pounds of phosphorus are insignificant sources. I think that you made that statement. I think we have a long way to go with your problem there and I hope that you feel that you are not--you know, your problem is not solved, you have a long, long way to go with reducing these to the levels that I think the State and us and this conference have asked you to reduce them to.

That is just a comment and I will let it sit as that.

MR. WHITE: Mr. Levin.

MR. LEVIN: Mr. Carey, how many people do you employ?

MR. CAREY: Just over 400. About 450 at the plant site.

MR. LEVIN: I would like to know what you mean by this statement, please:

"It does make it apparent that further restrictive legislation or regulation concerning industry effluent could cause significant economic dislocation of local industry and serious impacts for the community as a whole without producing any noticeable benefits to the community whatsoever."

What do you mean by that?

MR. CAREY: Well, we say that it could produce some. I am not sure just what they are until I know what the restrictions are. But it seems entirely possible to me.

MR. LEVIN: What seems entirely possible?

MR. CAREY: That it will have some impact.

For example, things could become so restrictive that, you know, you would have to pick up and leave.

MR. LEVIN: I thought that is wnat you were referring to. I just wondered.

MR. CAREY: Well, I would say a very way out kind of thing. I am certain that that isn't what anybody has in mind or anybody wants.

MR. LEVIN: How much investment does your company have in the Pensacola area?

MR. CAREY: We argue with accountants about that, but it is very significant. Original investment was probably on the order of magnitude of $40 to $50 million.

MR. WHITE: Any other comments?

MR. LEVIN: How much money is in your budget for ascertaining technology which could possibly result in the ultimate achievement of getting out of the bay? How much do you all spend of your budget on technology?

MR. CAREY: Mr. Levin, right now we are studying--spending, excuse me--it depends on what you are doing at the time. We have a total number of dollars we spend. Right now we are spending quite a lot of money for studies, such things as deep well disposal, spray irrigation, for example, and some of these more exotic kinds of, you know, resin absorption and these kinds of things for removal of nitrogen from low strength streams.

MR. LEVIN: Well--

MR. CAREY: So as far as these studies are concerned, we are complying, as far as I know, as quickly as we know how to do those things that the State has requested us to go back and review again.

MR. LEVIN: Mr. Carey, I want to tell you the way I feel. I can't speak for everybody; all I can tell you is how I feel myself. But I have made the statement hundreds and hundreds of times, perhaps not that many, but I have made the statement and I will stand by it, I can't speak for the Federal Government, but the Florida Pollution Control Department stands ready to cooperate any way possible, but to threaten is not going to mean anything as far as I am concerned.

MR. CAREY: Certainly we implied no threat with this.

MR. LEVIN: I don't know what else you could mean by what you said.

MR. CAREY: I am just saying that there is some impact. I don't know what it is and I don't know what it could be until we have the restrictions. I really don't know.

Certainly there is no intent to imply any threat. We are only trying to create a preamble that leads up to this proposal of cooperation that we are talking about.

MR. WHITE: Thank you, Mr. Carey. And I might add your proposal concerning a council is an interesting one and it is something that I think that the conferees want to address. Something like that would require much detailed working out and I am not sure just how this thing would be structured.

And I would like to go into this area now and make this our last presentation today. We would like to call Mr. Alec Little back, the Federal participant earlier in the day, to discuss something in line with what you were talking about on a program that we are looking into without getting into any specifics.

But thank you for your offer.

MR. CAREY: Very well. We want to be on record that we are willing to cooperate and to contribute whatever we can to the solution of this problem in its best fashion.

MR. WHITE: O. K., thank you.

JOHN A. LITTLE, DIRECTOR
SURVEILLANCE AND ANALYSIS DIVISION
SOUTHEAST WATER LABORATORY
ENVIRONMENTAL PROTECTION AGENCY
ATHENS, GEORGIA

MR. LITTLE: Mr. Chairman, I think it is appropriate, in view of the previous remarks, for me to make this particular presentation.

Several weeks ago representatives of the Florida Department of Pollution Control, the Alabama Water Improvement Commission, and the University of West Florida met with personnel of the U. S. Environmental Protection Agency in Atlanta. The purpose of the meeting was to review the many activities and actions which have taken place in the last year and to initiate a coordinated effort to determine in research detail the inner workings of the Escambia Bay ecosystem:

> Why has it reacted to man's abuse in such a violent manner?
>
> What can possibly be done to effect a rapid recovery concurrent with the strong pollution abatement program under way?
>
> How can we profit from the example of Escambia to prevent it from happening elsewhere?

Several points related to these questions were generated at this meeting, and in the period that followed additional details were obtained from the participants. At this time I would like to elaborate on some of these items and then present a recommendation for the conferees to consider.

Three general subjects were considered in the recovery study proposal:

> What remedial measures can be taken to expedite bay recovery concurrent with the point source pollution control program?
>
> What is the precise mechanism (or mechanisms) by which massive numbers of fish have been destroyed?
>
> How rapidly and by what means will natural recovery of Escambia Bay occur as waste

inputs decrease or are eliminated?

In the first subject area, a number of proposals for expediting recovery have been proposed:

Removal of toxic components and nutrients in the bay's sediments.

Modify the natural tidal and freshwater circulation patterns to effect better flushing of the upper bay.

Agitate or generate bottom sediments to accelerate natural stabilization of undesirable constituents.

Remove all fish which may die in the future--and as we have said, we expect more fish kills to occur--remove all fish which may die in the future from bay waters in order that these same fish will not add to the pollutant load. Labor forces needed to remove fish could include student ecological groups, State Highway Department personnel, or penal institution residents.

Evaluate fish exclusion techniques and success.

The practicality and necessity for each of the above and other recovery steps needs to be evaluated in detail.

J. A. Little

On the general subject of exact mechanisms of fish kills and water quality degradation, it is necessary to consider the following:

> What are the circulation pattern variations during different seasons, with influent tributary flow fluctuations, and changes in wind direction? Do the differences observed contribute to fish migration pattern differences and buildup of contaminants in any portion of the bay?
>
> What are all the toxicity factors associated with fish kills? Do algae contribute to the problem? Do pathological studies indicate a toxicity or disease-associated mechanism for fish kills?
>
> Is there a need to determine a complete nutrient budget for the Escambia Bay systems or are existing data adequate?

Finally, for the last subject area of documentation of change in the ecosystem, the following would provide information of great worth:

> The history of sedimentation rates and sediment quality differences, especially as wastes

are removed from the system.

The change in the biotic structure as recovery proceeds. For example--Will shrimp growth increase? Will menhaden migration patterns be altered? Will microbiological components be part of overall biotic change?

Mr. Chairman and conferees, some detail on each of the above has been obtained in recent interagency discussions. To an extent, resources (personnel and dollars) have been volunteered to accomplish the above recovery study steps. But in order for such a study to be successful, it is necessary for it to be fully coordinated.

At this time the Environmental Protection Agency recommends the following course of action:

That a recovery study team be organized under the overall direction of the Environmental Protection Agency,

That this recovery team include the University of Florida system through the University of West Florida, the Florida Department of Pollution Control, the Environmental Protection Agency (especially the Gulf Breeze Laboratory), and any other agency with an essential contribution to make.

That a specific plan for the recovery study, including staffing, financing, and basin investigation avenues, be completed within the next 60 days.

That any independent plans for gathering information in the next several months which would complement the basic objectives of the recovery program be encouraged to proceed.

In conclusion and before the question is asked, I do not consider that the above recommendation is just another study. We have seen all the symptoms of a diseased estuarine system here in Escambia Bay. With better diagnostic and rehabilitative techniques, we can prevent the disease from becoming communicable and hopefully benefit Escambia Bay at the same time. The estuary is perhaps the most complex of aquatic ecosystems and we must understand it better.

Thank you.

MR. WHITE: Thank you, Mr. Little.

Mr. Levin.

MR. LEVIN: Mr. Little, do you have any recommendations or suggestions that we can perform that could perhaps be a stopgap remedy to cut down on these fish kills until such a study as you suggested can be made?

MR. LITTLE: I think that some of the items that Dr. Hopkins mentioned should be considered. I believe that I couldn't add any new ones at this point myself.

MR. LEVIN: Do you agree about the White River and the filling in of the dredge area in Mulatto Bayou, that that ought to be done right away?

MR. LITTLE: I alluded to the fact that it ought to be studied. I am not sure of all the technical feasibility for doing that and I think we need to look at it. It should be a decision that can be made fairly rapidly in terms of the ability to do so. The effect would probably take a little longer to determine.

MR. LEVIN: What I am trying to find out is, you do think that that could be done before the summertime, that study?

MR. LITTLE: It is physically possible.

MR. LEVIN: Would you mind helping me, if you can? Mr. Carey said something about that they are responsible for a relatively small amount of the nitrogen that goes out into the bay, I think he said his figures were 50 or 60 times coming down the river. You see, either that is right or what we heard this morning was right. Either the river is healthy and we are not getting 50 to 60 times the amount of nitrogen or perhaps I misunderstand, being a political group, perhaps I misunderstand the effect of his statement.

Now, is this right? Is there 50 to 60 times the amount of nitrogen that Escambia Chemical or Air Products is putting out there in the bay?

MR. LITTLE: I am not sure of that exact figure, but I would warrant a guess that there is a substantial amount of nitrogen and phosphorus compounds in excess of that discharged from the local industries coming down the river.

Now, I would point out that there are differences in the types of these compounds and their effect on an ecosystem. We are talking about in some instances, perhaps, with the total nitrogen value, you may be comparing fertilizer with leaves, for example, or material that could be fairly stabilized and reacts differently once it reaches an ecosystem such as Escambia Bay. I think you are also saying that any estuarine system is a rich system and it receives large quantities of nutrients from a natural standpoint and I don't believe anyone would argue that point.

MR. LEVIN: The thing I am trying to find out, though, if 50 to 60 times the amount of nitrogen that Air Products is putting out in that water is coming down the river, do you feel like in your judgment that the amount that

Air Products is contributing is playing any significant role in the destruction of that bay?

MR. LITTLE: I would say this, that an estuarine system is able to take care of itself unless man interferes with it, and in this instance in Escambia Bay man has interfered with it and changed the input of nutrients to it and, therefore, this is the reason we have taken strong action. I very much am in favor of the program of the previous conference in the reductions that have been named and I feel that this will be of great benefit to this system.

MR. LEVIN: What reduction specifically are you talking about?

MR. LITTLE: I am talking about the 94 percent of these figures.

MR. LEVIN: All right. Gil says that that is perhaps not a good idea to figure percentages. How many pounds are you talking about?

MR. LITTLE: Well, I wasn't present during the first conference. Mr. Traina has those figures.

MR. TRAINA: Those figures, and I think Mr. White read them at the beginning, we can go through them here, but for Escambia Chemical, allowable waste effluents were 17 pounds per day of BOD, 477 pounds per day of total nitrogen, and 35 pounds per day of total phosphorus.

MR. LEVIN: Transposing that, is that the same thing that Dr. Hopkins was talking about, the 94 percent? Is that equivalent to the 94?

MR. LITTLE: I believe so, yes.

MR. LEVIN: Let me just make sure, now, that I understand. What you are saying is that the nitrogen coming down the river is a natural phenomenon, is this what you are saying?

MR. LITTLE: The nitrogen that we have identified at this point we consider to be at a natural background level and one which an estuarine system would normally be expected to receive.

MR. LEVIN: But yet added to that, the 1,500 pounds which Air Products is currently contributing, you feel like that that messes up the balance to sufficient extent to where it does cause problems in the bay?

MR. LITTLE: This is an aggravating item in terms of the damage to this particular bay.

MR. LEVIN: So it is not fair for Air Products--and I don't want to single Air Products out. It is the only one I have heard from so far. Do you think that it is, then, an unfair thing, as far as fairness goes, for them to hide behind the idea that we have got that nitrogen coming down the river, therefore you shouldn't pick on us for putting just this small amount into the bay? Do you think that that is a fair way of doing things?

MR. LITTLE: I think that we should do our utmost to remove all point source waste contribution to the bay and hope that this will restore it to its natural system of being able to assimilate what has come into the bay in past years.

MR. LEVIN: Are you familiar with any type of technology that could be utilized by Air Products that could permit them or would result in them being totally out of the bay? Maybe that is an unfair question to you, I am not sure.

MR. LITTLE: This is not really in my realm and in terms of the treatment technology I know as they do what current work is going on through grants from EPA and through other studies, and frankly I don't know of any one scheme at this moment which would be a total recycle type of scheme.

MR. LEVIN: Do you know anybody that would be available that could testify on this point?

MR. LITTLE: The only persons that I could think of would be in our advanced waste treatment program in Cincinnati and they haven't been contacted, to my knowledge, in regard to this particular problem here. They have worked on some others in other parts of our region, so perhaps this would be the group that we could contact.

MR. LEVIN: Would you be kind enough to do that and just as a personal favor let me know what they have got to say about that, please?

MR. LITTLE: All right. I am going to be leaving. If you want a comeback quickly, I am going to be leaving tonight. I will be glad to furnish this to you in the next few days.

MR. LEVIN: I would appreciate it very much. Thank you.

MR. WHITE: Any other comments or questions?

Just one point. You talk of 60 days in terms of developing this study plan. Is that about as tight as you think you could get it, Mr. Little?

MR. LITTLE: I think we are talking about getting in several groups and if we are talking 30 I think we would find out at the end of the 30 we are not quite there. I think 60 is a more realistic figure. This is something, of course, the conferees can consider and perhaps think of ways to cut that short. That is somewhat of an arbitrary figure.

MR. WHITE: Thank you, Mr. Little.

MR. LEVIN: Jack, are there any funds available for that type of study?

MR. WHITE: Let's go off the record a minute.

(Off the record.)

MR. WHITE: Let's go back on the record.

As I indicated a little earlier, this would be the last presentation today. We regret we didn't get to all of you and we will get a little earlier start in the morning by starting at 9, a half an hour earlier. Hopefully we will be able to go through and get most of you in by noon, go into executive session after that and come up with some recommendations.

We stand recessed until 9 in the morning.

- - -

(Whereupon, at 5:30 o'clock an adjournment was taken until 9 o'clock, Tuesday, January 25, 1972.)

MORNING SESSION

TUESDAY, JANUARY 25, 1972

9 o'clock

MR. WHITE: Let's go back in session.

I would like to explain Mr. Ravan's absence. He will be back with us later this morning. He was called back to Atlanta late last night and I think he will join us again at noon.

If you will, Mr. Mauriello, proceed with the Florida presentation.

MR. MAURIELLO: Mr. White, I believe we have one representative from Gulf Power Company who has a court commitment earlier this morning, so I think we will ask him to make Gulf Power's presentation.

BERT LANE, GENERAL COUNSEL
GULF POWER COMPANY
PENSACOLA, FLORIDA

MR. LANE: Thank you, sir, for that consideration.

My name is Bert Lane. I am General Counsel for Gulf Power Company.

I don't fool myself that a lawyer appearing as an invitee at a conference like this will not add anything. Mr. Ed Addison, the Senior Vice President of Gulf Power Company, had expected to be here, but because of illness in his immediate family which carries him away from Pensacola he is not able to be here.

At the last session of this conference it was recommended to Gulf Power Company that it retain the services of a qualified consultant and monitor the biota of Escambia River in the vicinity of the Crist steam plant, which has been done for a period of nine months or better, and I would like to ask our consultant to make a presentation to the conferees at this time.

Our consultant is Dr. Charles B. Wurtz, W-u-r-t-z, of Philadelphia, Pennsylvania, who has been both a consulting biologist and a teacher of the subject and related subjects since about 1946. He has written 70 papers which have been published on this and related subjects. He is a member of the American Society of Limnology and Oceanography, American Ecological Society, Water Pollution Control Federation, American Fisheries Society,American Association for the Advancement of Science.

Mr. Chairman, I would like to ask Dr. Wurtz to summarize what Gulf Power Company--not Gulf Power Company but what he has found in his checking on the biota in Escambia River.

MR. WHITE: All right.

DR. CHARLES B. WURTZ

CONSULTING BIOLOGIST

PHILADELPHIA, PENNSYLVANIA

DR. WURTZ: Mr. Chairman, conferees.

I have a prepared statement here, which I will give to the reporter at the conclusion of my presentation.

In the spring of 1971 Gulf Power Company began a quarterly biological monitoring program in the vicinity of the intake and at the discharge of the Crist Plant. The program was designed to evaluate any biological differences between the Escambia River at the mouth of Governors Bayou, on which the intake is located, and at the mouth of the discharge canal about one mile downriver. These locations are designated, respectively, Stations 1 and 2.

The biological materials used as the basis for study have been the macroinvertebrate or so-called bottom organisms. In general, these life forms have life cycles of at least one year and represent a fairly constant component in the ecological community. Microorganisms usually have very short life cycles and each species tends to be transient in nature. Thus weekly monitoring would be necessary to follow population trends of these microscopic forms of life. At the other extreme are the fish. Fish, however, are quite vagile and commonly withdraw from areas of biological stress or exhausted feeding grounds. Further, fish have strong migratory movements that are seasonally controlled. And last, the fish are physically the most difficult group to work with, requiring extensive equipment and man-hours in the field for proper sampling. Fishery surveys are usually done on an annual basis to compare season with season, and several years of study are needed to evaluate trends.

Any of these three biological groups within a community can be used for biological survey purposes. Sometimes all are used. However, the macroinvertebrate organisms form the most practical group for evaluating stream conditions on a regular basis within a reasonable period of time.

Sampling for this monitoring program began in May 1971. To date three surveys have been completed. Sampling was done May 21, August 24, and December 1, 1971. The fourth survey is scheduled for February 22, 1972.

Sampling is confined to the west bank of the river and includes about 100 yards of shoreline and bottom above and below the mouth of Governors Bayou and the mouth of the discharge canal. Collecting is done by hand-picking organisms from submerged surfaces, sieving soft substrate material such as mud or sand, and, in deeper water, taking bottom samples with a Petersen grab sampler. This is a miniature clam bucket.

Dr. C. B. Wurtz

All collected material is preserved in methanol. The identification of each species is carried out in the laboratory. Common field-recognizable species, such as the blue crab, are not collected. Their occurrence is recorded in the field.

To date 69 different macroinvertebrate species have been recorded from the two stations. No single survey had this many. Many organisms are strongly seasonal, and this is particularly true of the insects. Thus different species tend to succeed one another throughout the year. The number of species found during each survey is presented in Table 1:

At Station 1 in May 35 species, in August 31 species, in December 10 species.

At Station 2 in May 28 species, in August 27 species, in December 10 species.

For both stations together in each survey in May there was a total of 49 species found, in August 41 species, in December 14 species.

Of the 69 species collected during the three surveys only five were found during each survey. These were a snail, a pill bug, a scud or side-swimmer, a crab, and a midge larva. Of these five, only the snail was found at both stations during all three surveys.

Dr. C. B. Wurtz

The differences found from survey to survey are the product of seasonal change. These are normal cyclic chances controlled primarily by three cyclic environmental influences. These parameters are length of photoperiod, temperature and salinity. The resident fauna of the river has annual cycles that are adapted to these environmental influences and responds to changes in them.

The differences found between the two stations during each survey are the product of ecological differences. Station 1 is continuously seeded from Governors Bayou which drains an extensive area. Also there is a variety of shoreline habitats. Station 2 lacks this supporting source of species. Even more importantly, Station 2 lacks the habitat diversity of Station 1. At Station 2, for example, the shoreline above the mouth of the canal is fully sandbagged and there is a minimum of vegetative debris present. These differences lower the ecological diversity at Station 2.

The biological diversity is correspondingly lowered. However, the biological structure of the two stations is virtually the same. This is illustrated in Figure 1. In this figure the macroinvertebrate community is divided into its insect and non-insect components, and these represent the axes of the graph. The number of species at each station for each survey is plotted. The stations and surveys are identified in the figure. Both the insect and non-insect groups have the same mean number, 12, for the three surveys.

The biological structure of a community is readily described by descriptive statistics. The statistics used in the reports of these surveys include mean number of species, the standard deviation, the variance, and the coefficient of variation expressed as a percentage. Variance is commonly used in ecological studies of populations. As diversity among the stations increases the variance increases. The coefficient of variation is a measure of variation about the mean or average. When the coefficient of variation is less than about 25 percent, a stable community in equilibrium with the environment exists. Values greater than about 25 percent indicate the population is in a state of flux, readjusting to changed conditions.

Table 2 presents the data from which the descriptive statistics were developed:

Station 1, the insects in May, 17 species, August 17 species, December 3 species. The non-insects, May 18 species, August 14 species, December 7 species.

At Station 2, the insects in May 13 species, August 4 species, December 5 species. And the non-insects at Station

2, in May 15 species, August 13 species, December 5 species.

Table 3 presents the descriptive statistics developed during the preparation of this review:

Insects for all three surveys, the mean value is 12, standard deviation 6.08, variance 37.00, and the coefficient of variation 50.7 percent.

Non-insects for all three surveys, the mean is 12, standard deviation 4.98, variance 24.80, and coefficient of variation 41.5 percent.

Now, to put the insects and non-insects together, for the May survey the mean value was 16, standard deviation 2.24, variance 5.00, coefficient of variation 14 percent.

In August the mean was 15, standard deviation 1.83, variance 3.33, and the coefficient of variation only 12.2 percent.

In December the mean was 5, standard deviation 1.63, variance 2.67, and the coefficient of variation was up to 32.6 percent.

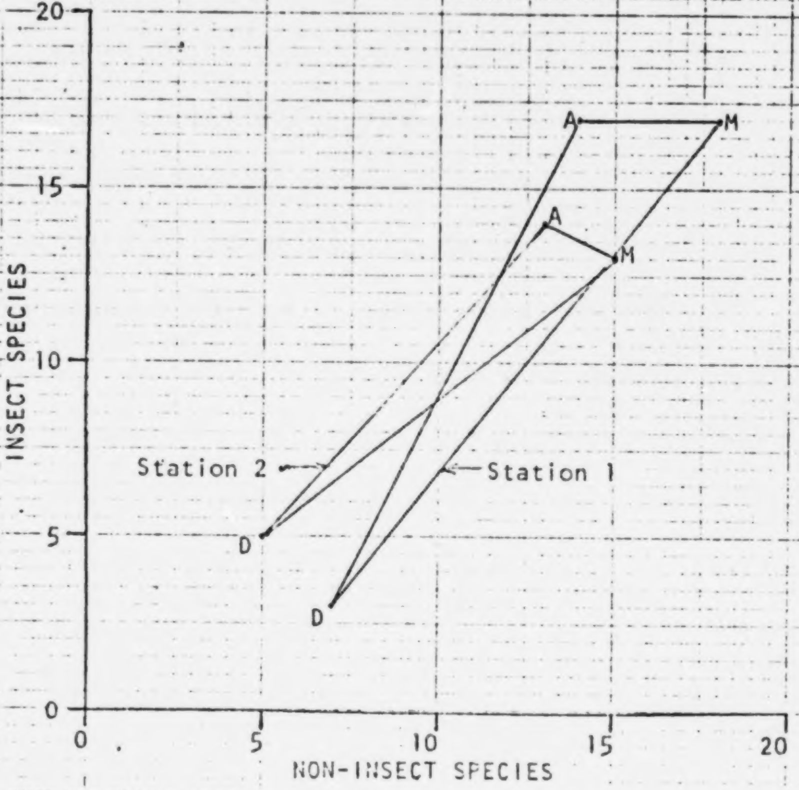
Two important environmental changes can be readily recognized from the statistics of Table 3. First, the insects reflect a high degree of instability during the three seasons. I recall to you the 50.7 percent coefficient of variation. This would be expected because of their strong seasonal occurrence. Of course the non-insects, with a coefficient of variation of 41.5 percent, also reflect seasonal changes, but this is not as pronounced as it is for the insects.

Second, during the early and late summer the biological community was highly stable, coefficient of variation 14.0 and 12.2 percent, respectively. On the other hand, by December the community was shifting to winter conditions and had not yet stabilized and the coefficient of variation was 32.6 percent. None of the biological studies to date indicate that the discharge from the Crist Plant is having a measurable biological effect on the Escambia River.

And that, gentlemen, concludes my presentation.

(Figure 1 referred to follows:)

FIGURE 1



M = May
A = August
D = December

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MR. WHITE: Thank you, Dr. Wurtz.

Questions or comments?

MR. TRAINA: Dr. Wurtz, did you say that you did observe a lowering of the biological diversity at the station, one of the stations, but attributed it to the habitat rather than to the discharge?

DR. WURTZ: Yes, Mr. Traina. Station 2, to date anyway, consistently has had about 15 percent fewer species than has Station 1, and this is attributed to the reduction in ecological diversity. Station 1 is a--

MR. TRAINA: Not to the discharge?

DR. WURTZ: Not to the discharge, no, sir.

MR. TRAINA: Is there a control station that you have attributed--

DR. WURTZ: Station 1 is my control station.

MR. TRAINA: I see.

DR. WURTZ: But you see, you have to look at this qualitatively as well as quantitatively. That is to say, if it were a product of the discharge, then there are certain species that tend to be more heat sensitive, shall we say, than other species, which would not occur, and this is not happening in the river.

MR. TRAINA: Another question, Dr. Wurtz. Have you done any work with regard to looking at the effects of running the biological species through the cooling system itself?

DR. WURTZ: No, sir, I have not.

MR. TRAINA: Is this planned as part of your studies?

DR. WURTZ: No, it is not, sir.

MR. TRAINA: Let me ask you this, Dr. Wurtz. Do you think this is--

DR. WURTZ: This would be very limited, Mr. Traina, on what species would go through, you know.

MR. TRAINA: Right.

DR. WURTZ: The tubes are what, a half an inch in diameter, something like that.

MR. TRAINA: I know you have had a lot of experience in this thing. Do you think this should be done? Do you think this is a significant thing to look at?

DR. WURTZ: In the literature, as you are aware, there is some contradictory work in this. Presumptively people would say if it goes through the tubes it is going to be killed. In point of fact this is not necessarily true. For example, in Markowski's early work in England, which was published in 1959 and 1960, he studied two plants there. One of them had a two-phase plant, came up through some kind of a header box, I don't know the engineering of this, it had a 14-degree delta T, and this plant discharged, much as Crist does, into a canal where this was the only source of water in the canal, and at the point of discharge he had an established biological community that consisted of 35 freshwater species and 62 marine species. He, too, was in an estuarine situation. And this was the same composition as the samples taken of the intake water going into this plant.

Now, Dr. Allen Brook at the University of Minnesota has given testimony before the Minnesota Pollution Control Board where he has studied algae going through the tubes of the L and S King Plant of Northern States Power Company on the St. Croix River, and he recognized that it is not just a question of intensity of heat. It is also a function of time, how long are they subjected to this heat. Water passes through the tubes, you know, in seconds, so that they can take this so-called thermal shock very quickly and it has a minimal effect upon them. But Brook not only put them through the tubes or put them through temperatures comparable to the tubes, he held them at those elevated temperatures and he has found no change in primary productivity, no change in losses.

I have done studies at plants where I have taken samples coming out of the boil of the discharge from the condensers and found organisms there living in the same proportion that I would if I had used a plankton net and towed it in ambient waters out in the bay.

MR. TRAINA: So it is your considered opinion that this is not a problem right here?

DR. WURTZ: This is not a problem here, no, sir, not at all.

MR. TRAINA: Thank you, sir.

MR. LEVIN: May I ask something?

MR. WHITE: Mr. Levin.

MR. LEVIN: Dr. Wurtz, would you mind reading your last statement, please, that you said the conclusion was that-

DR. WURTZ: Yes, sir. And I said:

> None of the biological studies to date indicate that the discharge from the Crist Plant is having a measurable biological effect on the Escambia River.

MR. LEVIN: Would you carry it one step farther and tell me what effect it is having on Escambia Bay?

DR. WURTZ: I couldn't carry it one step further and I don't think it is having any effect on Escambia Bay. I don't see how it could have an effect on Escambia Bay--

MR. LEVIN: You don't feel like the discharge of water 17 degrees above ambient is going to have any adverse effect on that body of water?

DR. WURTZ: I don't find it, sir.

MR. LEVIN: Dr. Wurtz, let me ask you something, and I admit, like somebody said yesterday, that we are politicians up here and we don't really know what we are doing, but it seems like to me as a layman that the proof of the pudding is in the eating.

DR. WURTZ: There it is, sir.

MR. LEVIN: O. K. You say that Gulf Power is not doing anything to the water, the people from Air Products said that that 1,500 pounds of nitrate they are putting out there is really a drop in the bucket so they are not doing anything, the people from Alabama say the stuff coming down the Escambia River is not doing anything, and I assume Monsanto and everybody else wants to say the same thing. Would you mind telling me what is killing those fish?

DR. WURTZ: Well, I listened to the testimony yesterday, Mr. Levin, and if you want to bear with me I would like to interject some comments.

MR. LEVIN: All right, sir, I wish you would.

DR. WURTZ: I have not studied the bay. I have not studied the bay since 1952, 1953. As you will recall from the Orlando hearings, I have had nearly 20 years experience on this estuary in biological studies.

There are a couple of items that different witnesses presented in their testimony yesterday that I take with a grain of salt. I don't question their presentation; I don't question their facts. I question their interpretation and also I question their predictive abilities on the strength of what they did present.

For example, Mr. Adams in talking about his study in Alabama--now, this is a stretch of the river that I haven't seen in many years, and I presume Container Corporation is some miles above the State border and that at the State border is this community of Brewton or East Brewton or whatever it is. But he spoke about subsequent to Container Corporation putting in waste treatment and what he read sounded like a darned fine waste treatment system, but among the parameters where he had measured quality characteristics and showed between 1970 and 1971 when this thing went into operation the improvement in these quality characteristics of the water; one of them was temperature.

Now, he used data from this data bank that EPA maintains, at least he said so and I presume that he did, the data are there, and one of the quality characteristics was a reduction in temperature. He gave the range of each of these and showed the lowering effect of this improved waste treatment. If he used the STORET data, I don't know what extent of data he used, but his study extended from November 22 to December 6, if I recall correctly, and he was talking there about a two-week period late in the season. I am not sure that that temperature is real, this lowering of the temperature. He presents it as such.

But if you will recall the work done by Tisdale, who was at one time, perhaps still is, associated with the State of Florida, Tisdale did very extensive temperature work operating from the gauging station at Century, and when you go over his data for any 10-year period you have a range in the average annual temperature of the river that exceeds 5 degrees Fahrenheit. Some years are just warmer than others or colder. There is no average that is always developed for each succeeding year. These averages fluctuate from year to year.

If Container Corporation, even with their waste treatment--and let's say that they have 95 percent improvement in their waste discharge, what does the remaining 10 percent amount to? The things that have been brought up, for example one is BOD.

Well, BOD is the sort of thing that in the normal linear flow of the river this is solved, it is not a substance that is present. BOD is a rate of demand of oxygen or the rate at which oxygen is used by bacteria that are decomposing organic matter, and this material in the flow of the river, this material would have been long since decomposed and mineralized. So this is not getting into the bay. Now, the minerals themselves may be. This I don't know. I haven't measured this. I haven't seen enough data to see this.

Let me come to a remark of Dr. Hopkins, and you were interested in this and I am a little unsure as to why. Dr. Hopkins has made the suggestion that White River be canalized on some curve before it rejoins the Escambia and brought down into the east end of the bay. And you thought that--and this was his intention, he suggested this, that this would create a flushing action that would come down through the east end of the bay and scour out, presumably scour out, depositions of sludge that have accumulated over X number of years. I question this. I really--I don't know that it won't happen, but I don't know that it will any stronger, I will put it that way.

The normal functions or the normal dynamics of an estuary and the water exchanges of an estuarine situation are such that I would be inclined to think this would not be effective.

MR. WHITE: Can I ask something here, Dr. Wurtz?

Now, I have a different interpretation of what Dr. Hopkins said yesterday and I would like to get this clarified. And we don't know, I should say, before getting into this, of course, what will be recommended or what might be a solution.

It is my understanding that the diversion of flow would help circulation, not so much remove the sludge deposits. Now, that is not the prime reason for the diversion. So--

DR. WURTZ: All right. All right. I--

MR. WHITE: And it also brings some fresh water into-

DR. WURTZ: I had the impression that it was--

MR. WHITE: --a pocket stagnated area where waste discharge is coming and it just--it rocks back and forth.

DR. WURTZ: See, it is very possible that you will not be able to keep that channel open. If you stopped and looked at the sediments of an estuarine system, you know that as the velocity of water decreases its ability to transport particles reduces, so that when you get deposition in the formation of a delta the biggest particles are right at the mouth of the river and as you get further and further away from the mouth of the river the finer and finer material settles out but the finest material is at the far end of the delta. And if all you had was a river coming down into the ocean, this would be exactly the setup that you would get, such as the Mississippi

Delta. But when you have a river that comes into a bay, a bay works in reverse. The heaviest particles that are transported settle at the mouth and the finest particles come up into the head of it.

So that you have at the head of every estuary what is referred to as a nutrient trap, literally this is what it is, and this, I think, is your bay problem. Whatever is coming in from any source is in point of fact accumulating there.

Now, you are talking about controlling menhaden. In point of fact, this is nature's control, those menhaden kills, literally.

MR. LEVIN: Excuse me. Do I understand what you are saying is that the fact those fish are dying out there is really beneficial?

DR. WURTZ: I think so indeed, yes. This is your problem, trying to get rid of this accumulative material.

MR. LEVIN: You mean getting rid of those menhaden?

DR. WURTZ: This is--now it is concentrated into menhaden meat instead of phytoplankton protoplasm.

MR. LEVIN: And that we really ought to be thankful for the fact that those menhaden are dying every year instead of being concerned about it?

DR. WURTZ: No, you are carrying this a little further than I would care to project it. Under the present setup I think this loss of menhaden is not that critical, I truthfully don't believe that it is. I think that this is nature's self-correcting action.

MR. LEVIN: How come nature isn't doing it in any other bay besides Escambia?

DR. WURTZ: Because I do think the nutrients in this bay have accumulated more than in a bay that has not been developed to the extent that this one has.

MR. LEVIN: When you say development are you talking about--

DR. WURTZ: I am talking about urbanization, introduction of industry, all the things that go with human culture as we recognize it in this country.

MR. LEVIN: So that if you were sitting on this Board or if you were Chairman of the Pollution Department of Florida, what you would do is you would just say, well, that is nature's way of doing things, let's don't concern ourselves with this problem?

DR. WURTZ: No, if I were--no, no, that is not. No, I would have a positive program, Mr. Levin, such as you--

MR. LEVIN: What sort of positive program would you recommend, Doctor?

DR. WURTZ: I would do exactly what these companies are now doing.

MR. LEVIN: What?

DR. WURTZ: Now, I listened to Air Products yesterday. I have never been on their property, I have never seen it, I don't know the personnel, don't know them as well as you do, don't know anything about them, but it seems to me that here is an outfit that has a multi-million dollar capital investment, they are a member of this community, the company itself is composed of people and these people live here, they are interested in the environment, they have spent I don't know how much money on waste treatment. Now, they have done this, admittedly, under the goad of regulatory agencies. Perhaps this is necessary. As a matter of fact, we know that it is in many instances. But they are doing something.

Now, how far can they go? They sit here and they have competent engineers, I presume they do, who design a system--I know they have got a good biologist; you are not going to find anything better than Jim Lackey in this area--who is giving them guidance and they have developed a biological process for the reduction of nitrogen loadings, and they sit here and I think with some justification are proud of what they have done. They showed pictures of this, they have come a long, long way.

And then Mr. Traina sits there and says, "Well, I don't think it is going to work." Maybe Mr. Traina is a smarter engineer than all their group put together, but you know, let's give the devils their due. They are trying.

MR. TRAINA: An appropriate use of the term, sir. (Laughter.)

DR. WURTZ: This I wouldn't know. You know them better than I do. (Laughter.)

MR. TRAINA: Mr. Chairman, I know I--

MR. WHITE: Mr. Traina.

MR. TRAINA: I know I said I didn't want to make any more comments, but I think a comment is in order, several comments are in order. I will try to confine mine.

First the implication--and Dr. Wurtz did say he really didn't know about it, but the implication that an industry some 40 or 50 miles upstream might be affecting the temperature of the river today after making a half hour presentation how an industry right in the bay is not affecting the temperature or the biota to me seems rather stretching some points.

We have had, you know, some discussions in other areas of the State, I might add, as well as this area and I appreciate I did ask you some specific questions with regard to your studies and I accept the propositions you made. However, I do feel that unless there is some scientific data you have to present about the other aspects of this problem, I don't know whether or not we could--

DR. WURTZ: Mr. Traina, I was responding to a request from Mr. Levin to--

MR. WHITE: Mr. Traina, Mr. Levin asked the question and I think we can spend a few minutes on this, if Mr. Levin is satisfied with the answer now.

Do you have any other questions, Mr. Levin?

DR. WURTZ: I would like the record to show that I did not say Container Corporation was raising the temperature of Escambia Bay or anything else.

MR. WHITE: Fine.

MR. LEVIN: But it is your view that these industries are not really doing anything that materially affects the makeup of that bay, that those fish would be dying probably even if they weren't there?

DR. WURTZ: I think that this would be cumulative. Maybe we have here--

MR. LEVIN: I don't know what that means.

DR. WURTZ: --in 10 years what under natural circumstances would not have occurred for 50 years.

MR. LEVIN: And that it is your view, as you say, that we really ought to be thank--that this is Mother Nature's way of controlling the menhaden?

DR. WURTZ: Yes, but I am not saying that these industries should not have waste treatment, Mr. Levin, and designed, you know, to some reasonable degree of efficiency to reduce this burden.

MR. LEVIN: Let me ask you this Suppose we could, by grace of God, get everybody out of that bay. What do you think, do you think menhaden would continue to die there?

DR. WURTZ: I think until current depositions that occur there are removed, scoured out, which I presume would occur, let's say, with a hurricane type of--some catastrophic physical change.

MR. LEVIN: After that would the menhaden continue to die?

DR. WURTZ: I shouldn't think so.

MR. LEVIN: Then why would Mother Nature all of a sudden decide that menhaden no longer need to die in order to control the population?

DR. WURTZ: Because you wouldn't have the population of menhaden that you do now, you wouldn't have as many, there would not be the available food to support that population.

MR. LEVIN: I see.

MR. WHITE: Mr. Crockett?

MR. CROCKETT: Dr. Wurtz, referring to the report presented by Mr. Adams, I believe you used dates in November and December. The study was actually made in June. I don't think the comparison of temperatures, temperature of waste discharged by Container during the June 1971 study and the August 1970 study, were introduced to show any great benefit. There is substantial data available in our files which will show that the temperature effect of Container's wastes is negligible if measurable.

DR. WURTZ: I would expect this to be the case, as a matter of fact, Mr. Crockett.

MR. WHITE: Mr. Levin has one more question and then I have one brief comment I would like to make.

MR. LEVIN: Dr. Wurtz, I don't mean this to be ugly and to be nasty, but as a trial lawyer I can't help but ask this question.

Would you mind telling me how many times that you have testified for power industries in hearings such as this or in court for power industries?

DR. WURTZ: I couldn't respond to that, Mr. Levin. I truthfully don't know. You are talking about 20 years experience in the field of pollution biology. I have no way of responding to that.

MR. LEVIN: Well, would it be way up into the hundreds?

DR. WURTZ: Oh, no. No, sir. In point of fact, it is only within the last two or three years that administrative hearings occur with the frequency that they now do and litigation is something that nobody goes to unless their back is to the wall. I don't think--

MR. LEVIN: Well, the thing--

DR. WURTZ: I don't think that I have ever been in court for a power industry, with one exception.

MR. LEVIN: The thing I am trying to figure out is-- You are from where? Where is your home?

DR. WURTZ: Pennsylvania.

MR. LEVIN: --why it was that Gulf Power went all the way to Pennsylvania to hire you; I can't figure that out.

DR. WURTZ: Because I am a specialist in pollution biology.

MR. LEVIN: You mean there are none in the South who are specialists?

DR. WURTZ: There are. There are none, however, that have 20 years experience, including that much experience here on the Escambia system. I don't believe that there are any individual consultants operating as I do that will operate on a broad geographic area. Most of them operate within their own State or one or two neighboring States.

MR. LEVIN: Have you ever found any cases where discharge of heated water does any damage to a body of water?

DR. WURTZ: Oh, yes, sure.

MR. LEVIN: You have?

DR. WURTZ: Sure.

MR. WHITE: Just one observation, Dr. Wurtz. I mean I think we are clearly on record about the waste limits that were established and I think that certainly the conferees feel that they can and should be enforced and I possibly should have intervened before in this exchange. I think we got a good bit off the track. But we feel that the companies or someone is going to have to come up with the engineering technology to achieve this and the burden is certainly on them at this point.

Any other comments?

MR. MAURIELLO: I would like to ask a question, Mr. White.

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: Dr. Wurtz, have you ever in your background done any work within an estuary itself, not just in the river as the Gulf Power situation?

DR. WURTZ: As a matter of fact, here in the Escambia, Mr. Mauriello, I did the oyster and shrimp survey work.

MR. MAURIELLO: I would like to get your opinion of something. Dr.Hopkins yesterday made a comment and a suggestion, you mentioned it, the White River channelization. What is your opinion as to man changing the natural flushing characteristics of a bay? Has this proved to be of an advantage or a disadvantage?

DR. WURTZ: I think that there are circumstances where it is an advantage, Mr. Mauriello. I think that what we fail to recognize is that man is as much a part of the world as the menhaden and that we move in the world to prevent damage by controlling it. For example, if you look at Holland, the whole Zuider Zee is an artificially controlled setup and it has been in existence for centuries. The Nile Valley itself has been a human artifact for 6,000 years just through irrigation.

And I do believe that it is beneficial to control, to design and control, for our superimposed human activities. This is why we create artificial lakes. We put in hydro plants. And I think the same philosophy does apply to estuaries.

I think that the head of this estuary, based on what I have heard, not on any studies of my own, should indeed be scoured out one way or another. Now, the engineering and cost, and so on, as to who does it, how much, and all the rest of it, this I am not prepared to respond to.

MR. MAURIELLO: Thank you.

MR. WHITE: Thank you, Dr. Wurtz.

MR. LANE: I would just like to conclude and I believe, Mr. Chairman, that the rapport between my client and Mr. Levin's staff is such that I can jest a little bit. Our position is that there are millions of little bugs just praying to be born into warm water being discharged from Crist steam plant, and Mr. Levin's staff does not agree with that--or does agree with that. Their statement yesterday was that:

> The plant heat load that reaches the bay has not been compared to natural heat loads in the area of acute biological damage to the bay. If it is required to remove this heat load from the river and the bay, cooling towers at an estimated cost of $3 million would be required. Topography precludes cooling ponds. In view of the indeterminate effect of thermal additions to the bay, cooling of the present plant discharges should not be required until thermal studies of the bay in the vicinity of the river

mouth have been made.

And we concur in that 100 percent.

MR. WHITE: Please proceed.

MR. MAURIELLO: Monsanto Chemical Company and Jim Lipe would like to make a statement.

JAMES E. LIPE, MANAGER
ENVIRONMENT AND ECOLOGY
MONSANTO TEXTILES COMPANY
PENSACOLA, FLORIDA

MR. LIPE: Mr. Chairman, conferees.

I am James E. Lipe, Manager of Environment and Ecology, for Monsanto Textiles Company, and I am a resident of Pensacola.

I would like to request that the remarks and presentation I make this morning become a part of the record of this conference and in order to--

MR. WHITE: May I ask simply, do you have a slide presentation?

MR. LIPE: Yes, sir, we have a slide presentation to assist in the presentation--

MR. WHITE: Are these slides reproduced in the report?

MR. LIPE: --but all copies of the material that we present on the slides are attached to the report.

MR. WHITE: Fine.

MR. LIPE: The graphs and charts are the second part of that package.

MR. WHITE: One other question. Do you plan to go through the entire written text?

MR. LIPE: In most part, yes, sir.

MR. WHITE: Well, fine, then.

We will accept your attachments, then, for the record, your charts, and then we will just let you go ahead with the presentation and it will get in the record that way.

MR. LIPE: Fine. Thank you, sir.

(The above-mentioned charts follow:)

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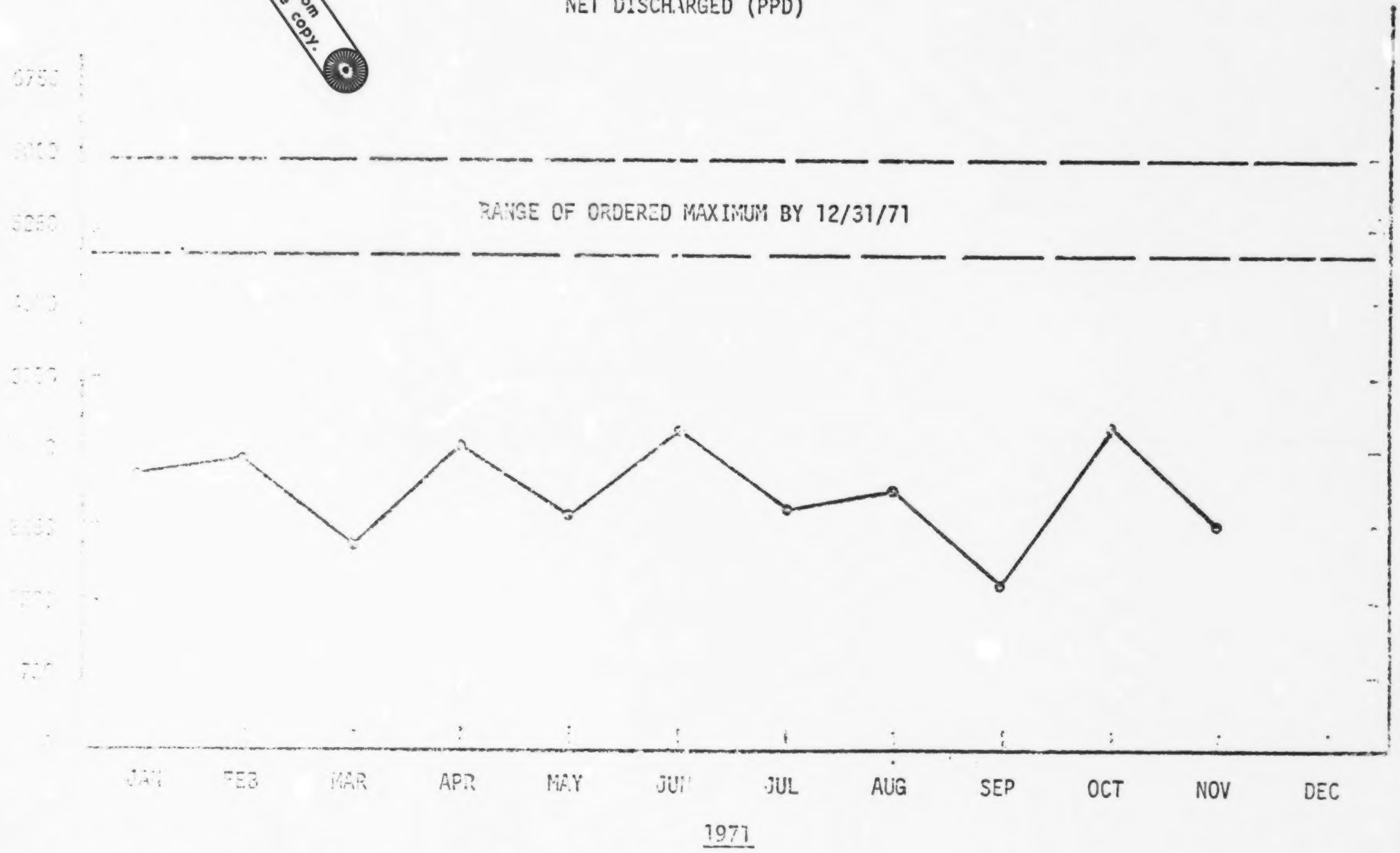
MONSANTO

BOD_5

NET DISCHARGED (PPD)



MONSANTO

TOTAL NITROGEN

NET DISCHARGED (PPD)

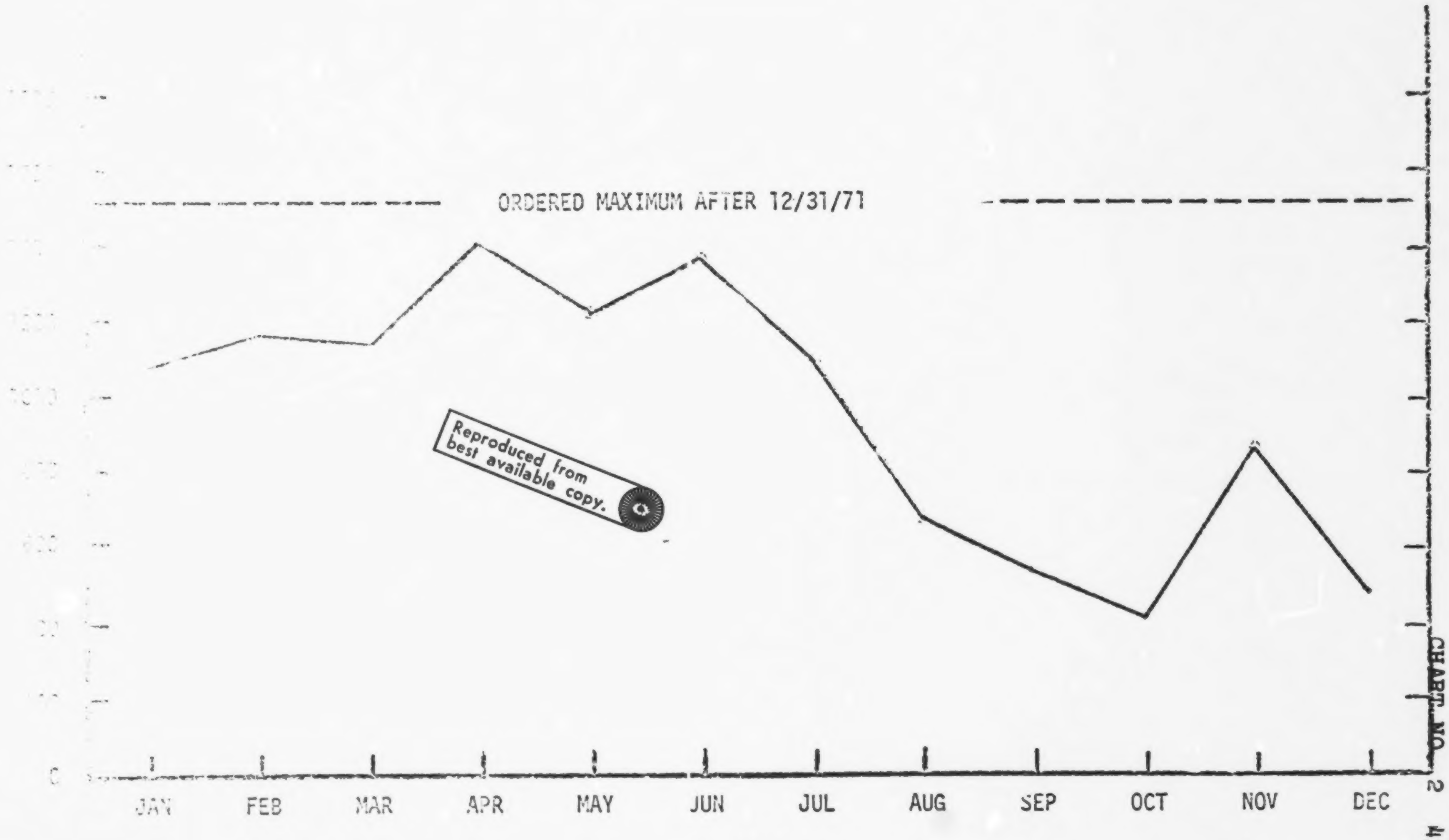


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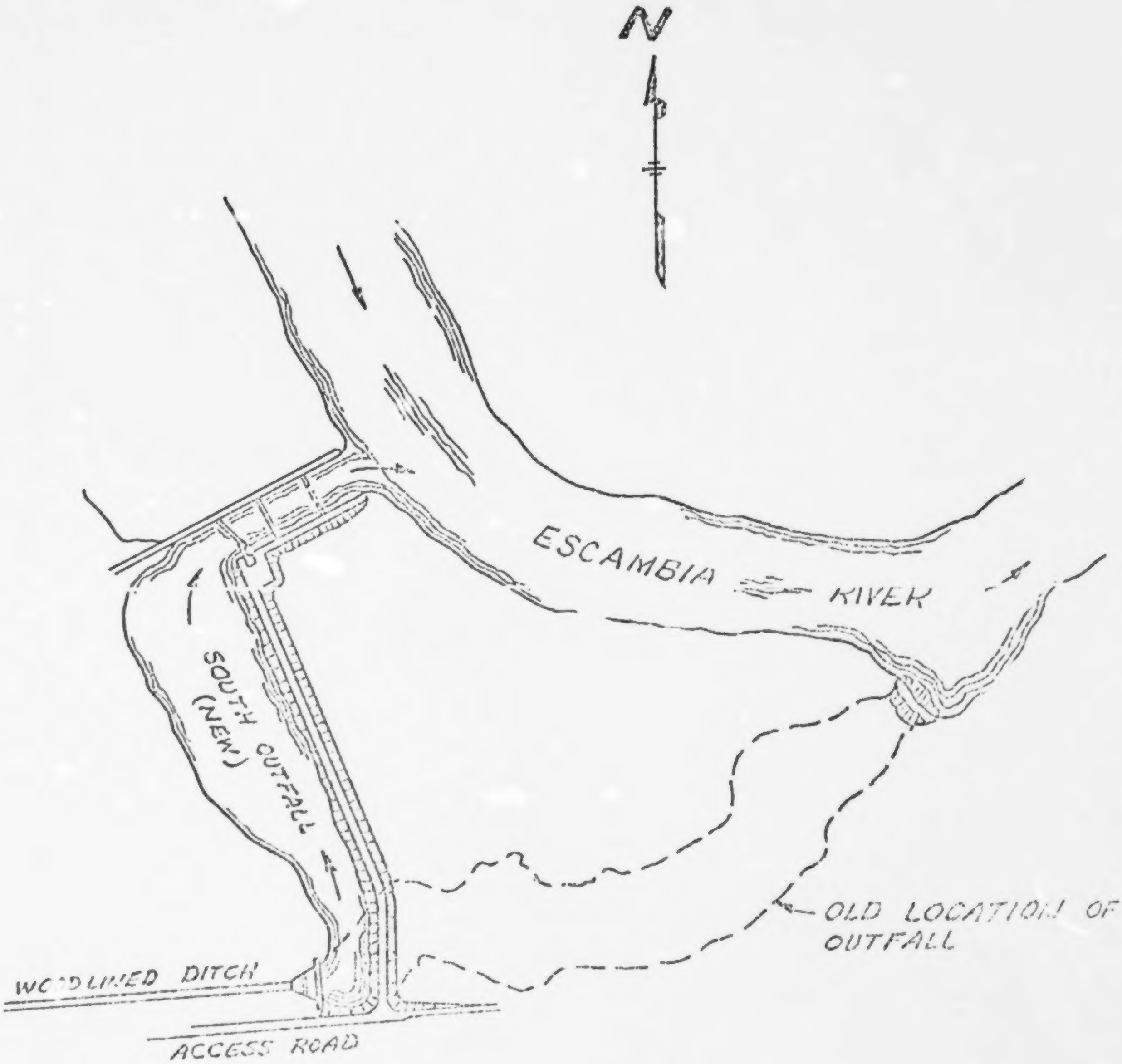
CHART NO. 2

CHART NO. 3



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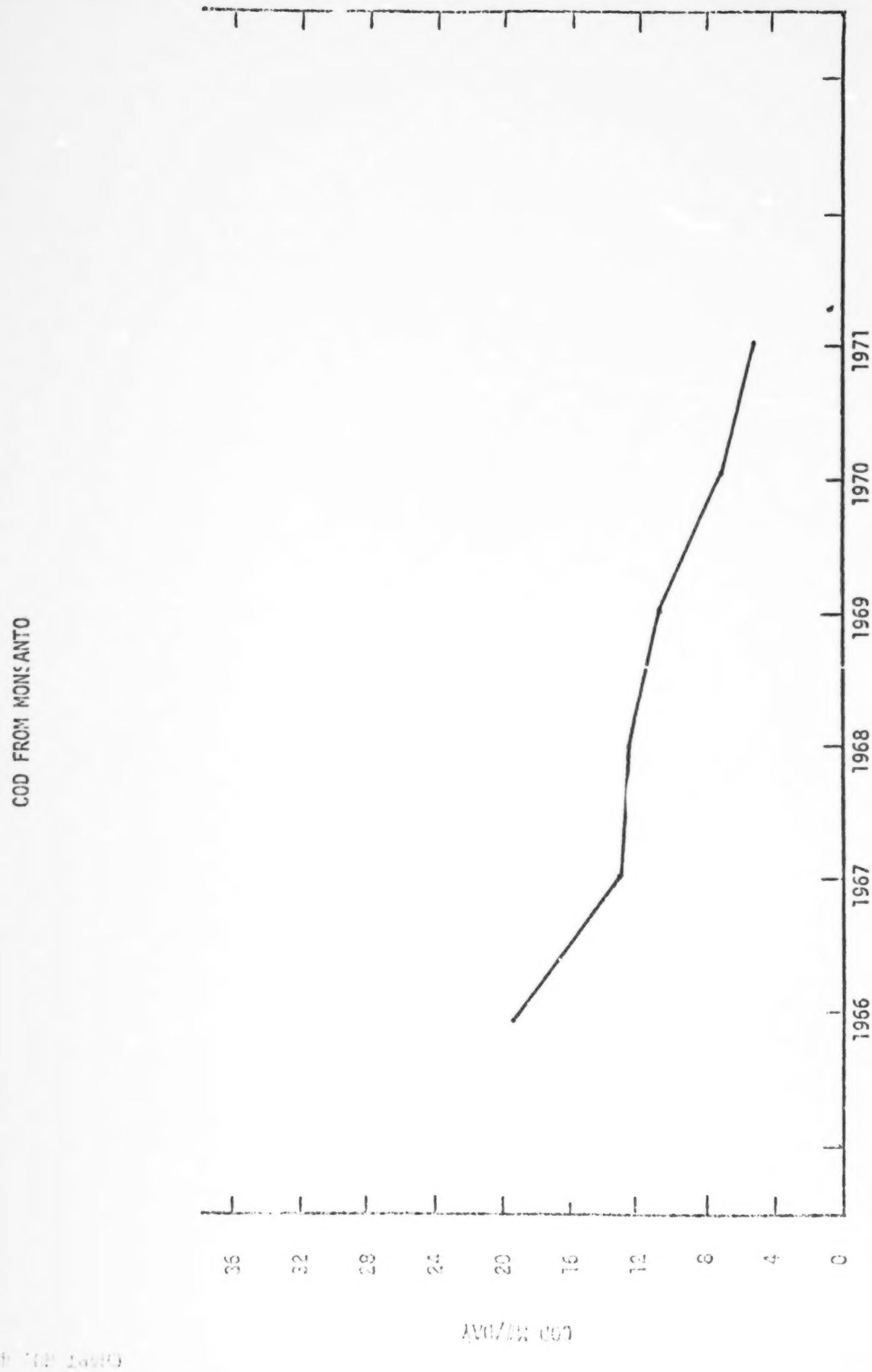
MONSANTO
PENSACOLA, FLORIDA

OUTFALL PLAN.

SCALE IN FEET
100 0 100 200 300 400

CHART NO. 4


COD FROM MONSANTO
1966
1967
1968
1969
1970
1971
36
32
28
24
20
16
12
8
4
0
COD M#/DAY

MONSANTO COMPANY
PENSACOLA PLANT

OVERALL REMOVAL EFFICIENCY

TOC	99.2
TN	98.8
P	99.2

ANALYSIS OF ESCAMBIA RIVER WATER
ABOVE MONSANTO
1971

(PPM)

	MIN.	MAX	AVG.
BOD_5	0.2	3.5	1.0
TOC	5.9	11.6	9.0
COD	13.0	29.0	23.0
P	0.01	0.04	0.03
TOTAL N	0.17	0.72	0.33
ORG & NH_3-N	0.04	0.65	0.20
NO_3-N	0.02	0.25	0.13

CHART NO. 7

ESCAMBIA RIVER DATA
ABOVE MONSANTO
JANUARY-OCTOBER, 1971

BOD_5	44,000 PPD
TOC	360,000
COD	00,000
ORG & NH_3-N	7,500
NO_3-N	4,600
TOTAL N	12,200
P	900

THEORETICAL OXYGEN DEMAND
OF ESCAMBIA RIVER WATER
ABOVE MONSANTO
1971

OXYGEN REQUIRED BY TOC	960,000 PPD
OXYGEN REQUIRED BY NITROGEN	34,000
TOTAL TOD	994,000

ESCAMBIA RIVER DATA
ABOVE MONSANTO

BOD_5	44,000 PPD
COD	900,000
TOD	994,000

BOD_5 MEASURES LESS THAN 5% OF
RIVER WATER OXYGEN DEMAND

ADVANTAGES OF TOC

1. RAPID FEEDBACK - ELIMINATES 5 DAY DELAY
2. CONTINUOUS MONITORING POSSIBLE
3. MORE DEFINITIVE AND MEANINGFUL

SOLIDS ANALYSIS
ESCAMBIA RIVER WATER
ABOVE MONSANTO
1971
(PPM)

	MIN.	MAX	AVG
TOTAL SOLIDS	69	151	102
TOTAL DISSOLVED SOLIDS	61	124	90
VOLATILE DISSOLVED SOLIDS	27	53	42
FIXED DISSOLVED SOLIDS	25	87	48
TOTAL SUSPENDED SOLIDS	6	27	12
VOLATILE SUSPENDED SOLIDS	0	6	3
FIXED SUSPENDED SOLIDS	1	24	9

SOLIDS CONTENT OF

ESCAMBIA RIVER WATER

ABOVE MONSANTO
1971

TOTAL SOLIDS	2,085,000 PPD
TOTAL DISSOLVED SOLIDS	1,833,000
TOTAL SUSPENDED SOLIDS	252,000
TOTAL VOLATILE SOLIDS	811,000
TOTAL FIXED SOLIDS	1,274,000

ESCAMBIA RIVER
ABOVE MONSANTO
SUSPENDED SOLIDS

1971

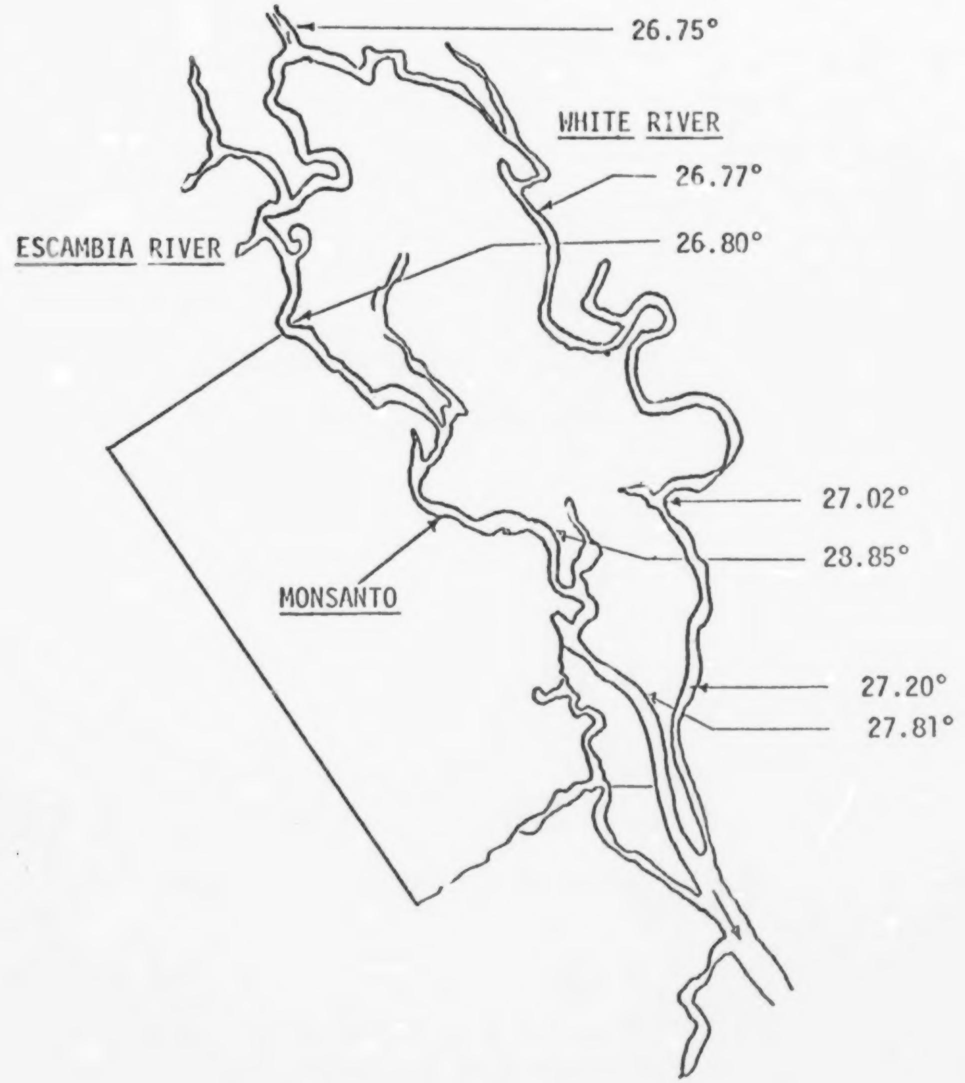
TOTAL SUSPENDED SOLIDS	252,000 PPD
VOLATILE SUSPENDED SOLIDS	70,000
FIXED SUSPENDED SOLIDS	182,000

LOAD IN ESCAMBIA RIVER

(PPD)

	WITH MONSANTO	WITHOUT MONSANTO
BOD_5	46,400	44,000
TOC	362,250	360,250
COD	906,000	900,000
ORG & NH_3-N	7,850	7,530
NO_3-N	4,850	4,635
TOTAL N	12,700	12,165
P	915	875
TOTAL SOLIDS	2,120,000	2,085,000
SUSPENDED SOLIDS	253,000	252,000

CHART NO.15


26.75°
WHITE RIVER
26.77°
ESCAMBIA RIVER
26.80°
27.02°
28.85°
MONSANTO
27.20°
27.81°

MONSANTO

CURRENT PROJECTS

DESIGN OF SYSTEM TO REDUCE
TOC LEVELS 30 TO 50%

FEASIBILITY STUDIES FOR 60 TO 70%
REDUCTION IN TEMPERATURE OF DISCHARGE

CHART NO. 17

ESCAMBIA RIVER FLOW

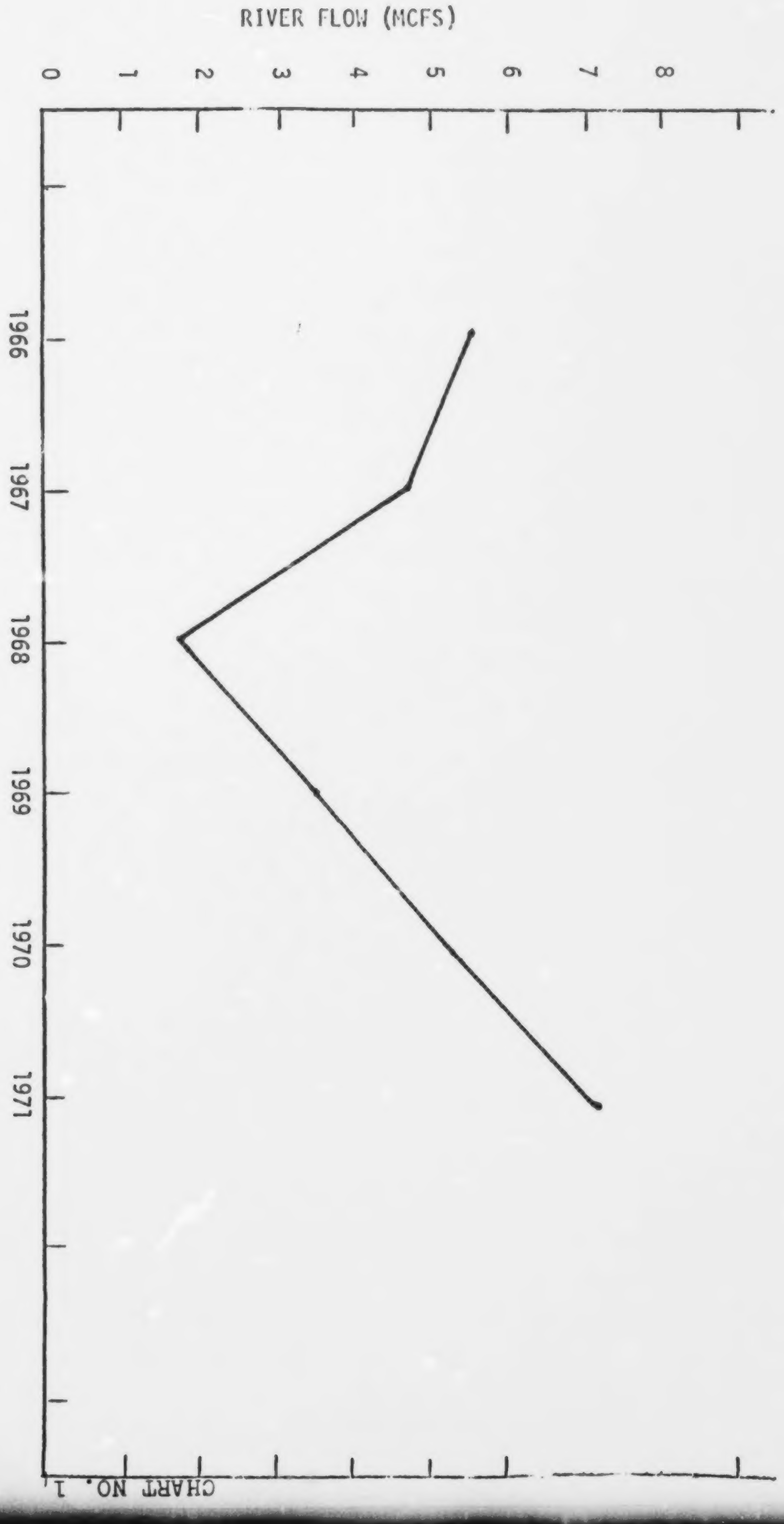
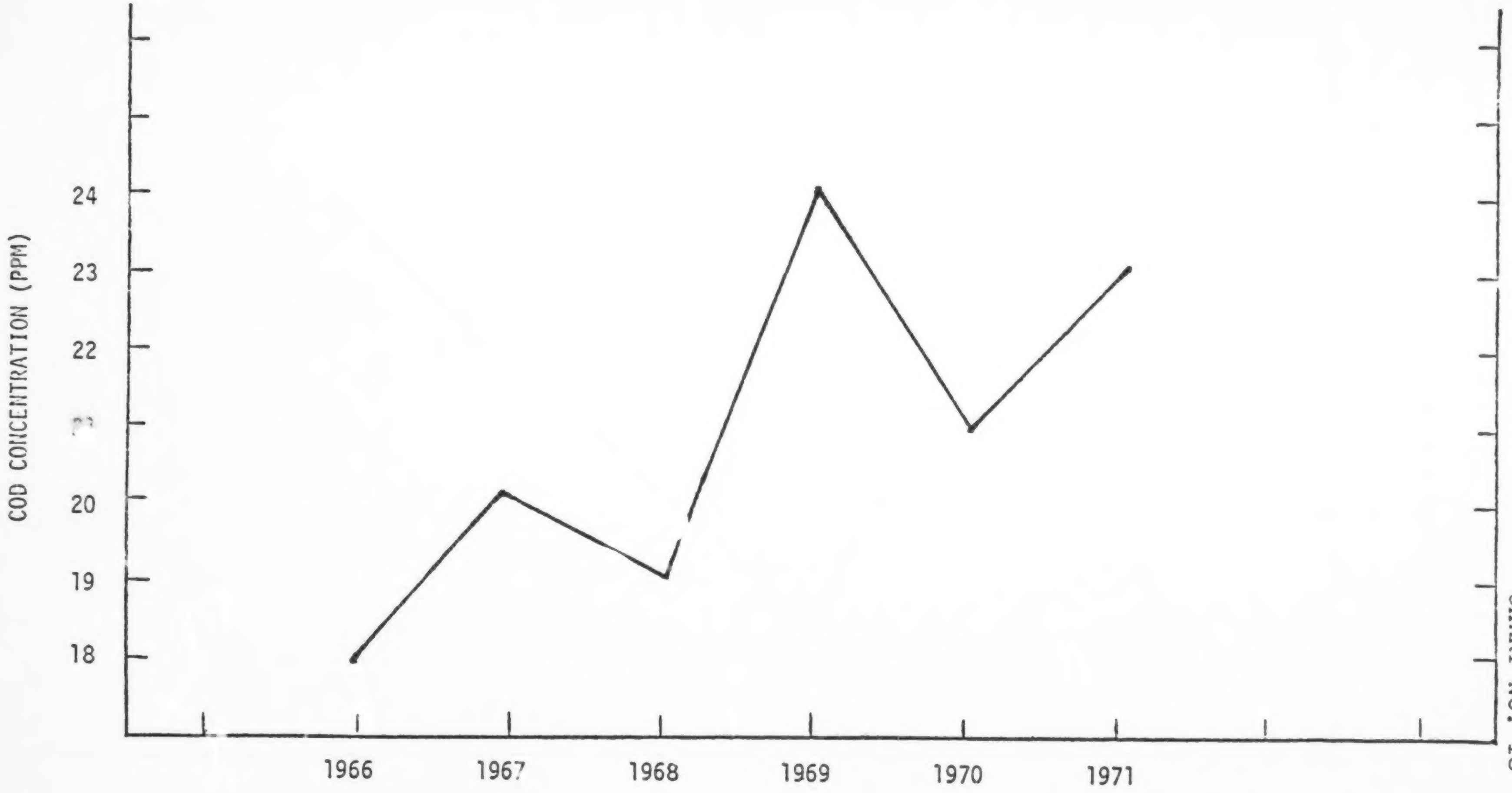
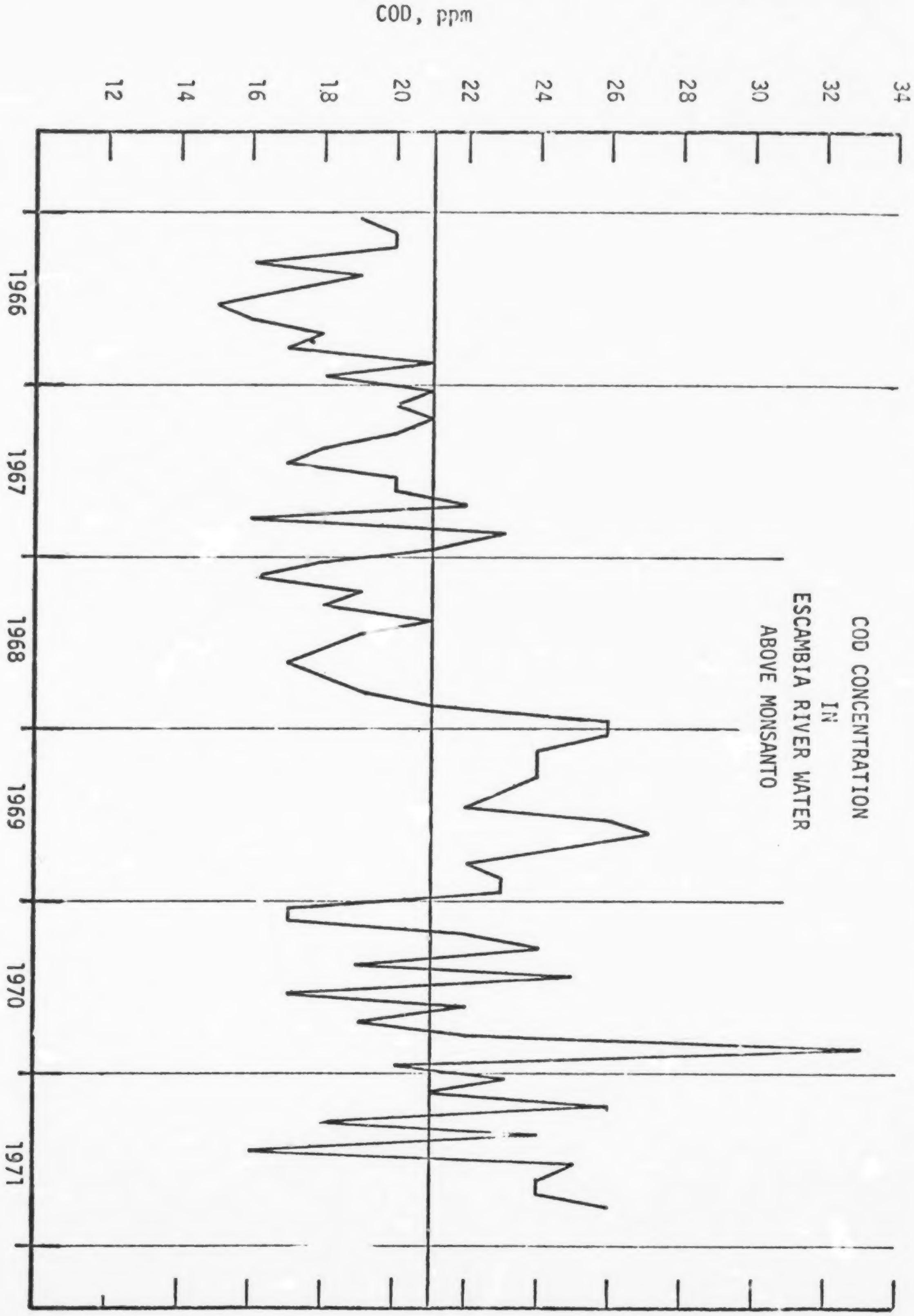


CHART NO. 18

ESCAMBIA RIVER
COD CONCENTRATION
ABOVE MUNSANTO





COD CONCENTRATION
IN
ESCAMBIA RIVER WATER
ABOVE MONSANTO

CHART NO. 20

ESCAMBIA RIVER
COD LOAD
ABOVE MONSANTO

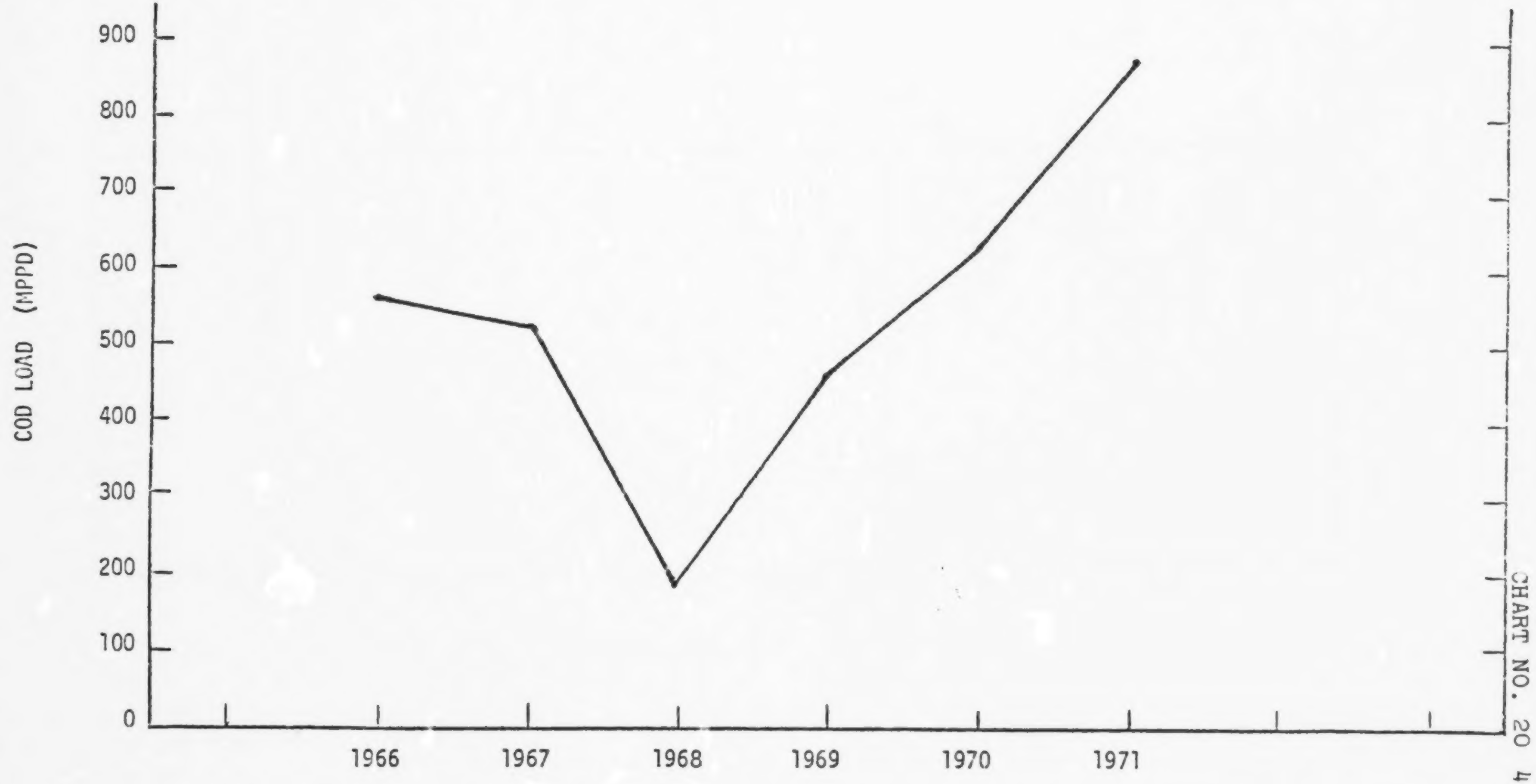


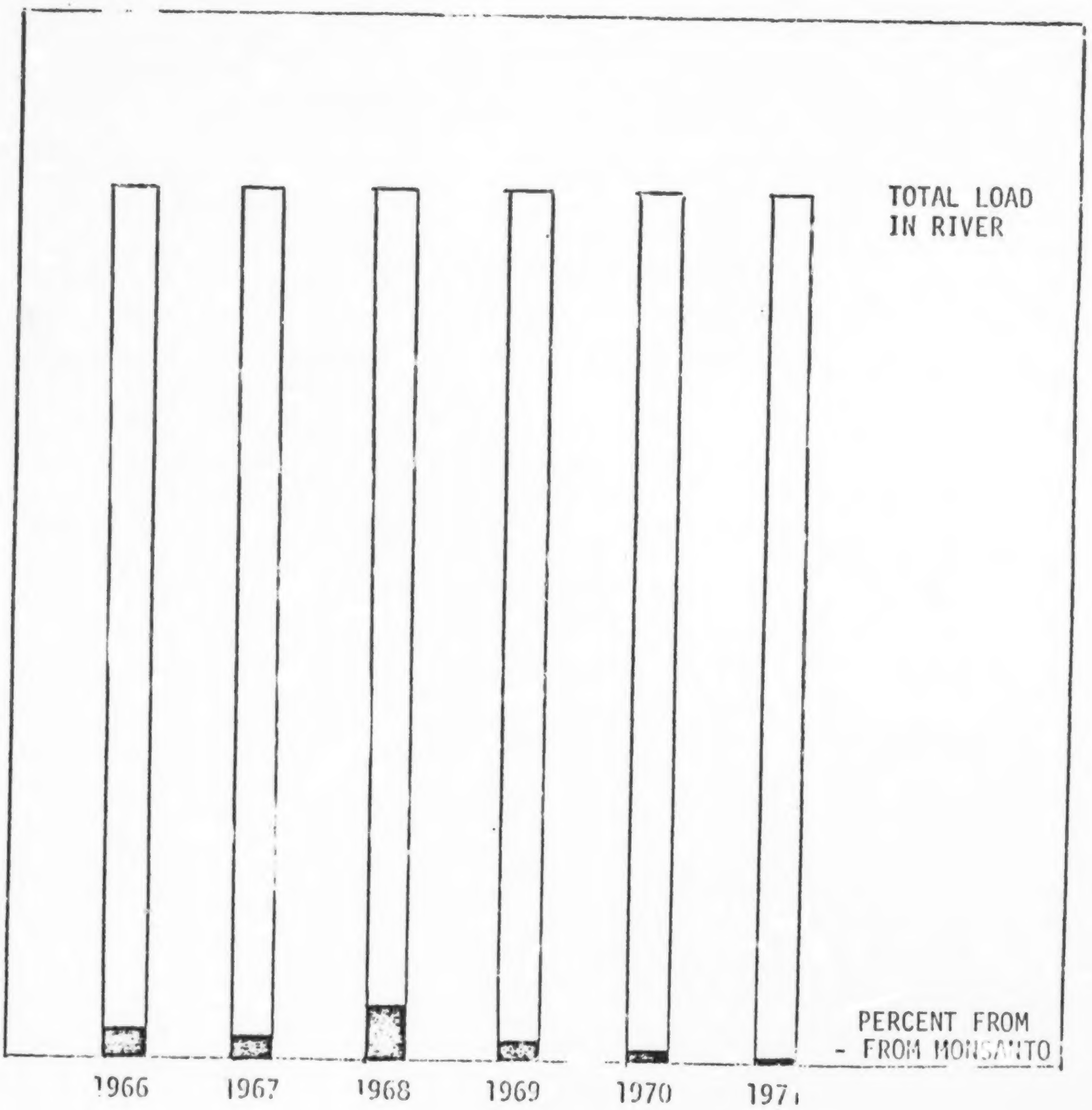
CHART NO. 21 444

TRENDS IN COD

(PPD)

	RIVER	MONSANTO
1969 LEVEL	466,000	10,400
CHANGE 1969-1970	+159,000	-3,000
CHANGE 1970-1971	+275,000	-1,600
1971 LEVEL	900,000	5,800

MONSANTO'S CONTRIBUTION
TO
COD LOAD IN ESCAMBIA RIVER



J. E. Lipe

MR. LIPE: I would first like to give a brief report on the status of the Monsanto Pensacola Plant's pollution abatement efforts. Second, I would like to present to the conferees data on the Escambia River which I believe should be of significant value in your deliberations about Escambia Bay. And third, I would like to present a comparison of Monsanto's and the Escambia River's discharges into Escambia Bay. This data clearly indicates that as reported by the Florida Department of Pollution Control in September 1971 Monsanto's contribution is insignificant and highlights the need to deal with other sources. I will then indicate our plans to even further reduce this already insignificant amount. And finally I will present data that indicates the level of pollution in the Escambia River above Monsanto is showing an increasing trend.

...Chart No. 1...

The Pensacola Plant is currently operating under two separate consent orders issued by the Florida Department of Pollution Control. The first of these issued in August 1970 sets a maximum discharge limit for BOD_5 and total nitrogen which were to be achieved by the end of 1971. This first graph shows that for BOD_5 we not only met the order but have operated at a level some 50 percent below that order and that this level was reached a full year ahead of schedule.

J. E. Lipe

...Chart No. 2...

The second graph for total nitrogen again indicates that we met the ordered requirement a full year ahead of schedule and are presently operating at a value of about one-third the order limit. It was reported by an official of the then Federal Water Pollution Control Administration at the first session of this conference in January 1970 that 500 pounds per day of total nitrogen discharged from a source to the river made no significant contribution to the eutrophication of Escambia Bay. Our present discharge rate is essentially at that level.

...Chart No. 3...

The second order issued by the Department of Pollution Control in February 1971 asked for changes in our main outfall structure to insure that no sediments in the outfall could be washed or eroded into Escambia River. To comply with this order, an entirely new outfall was constructed and placed in operation in May 1971. The old outfall was sealed off from the river and is being filled with inert material to completely cover any sediments present.

...Chart No. 4...

The next chart indicates the COD level in our discharge each year since 1966. I show this only to indicate the long-term downward trend and that our abatement efforts and environmental concern have not been recent developments.

...Chart No. 5...

Our present removal efficiencies are shown on this chart in that TOC, total organic carbon, we have a 99.2 percent removal rate, total nitrogen 98.8 percent, and phosphorus 99.2 percent.

...Chart No. 6...

Since before the plant began operation we have monitored the water quality in the Escambia River. In recent years we have expanded the number of parameters in the river which are monitored. This chart shows the analytical results obtained during the first 10 months of last year, 1971. These values represent some 40 samples taken a short distance above our plant at weekly intervals and I believe are in good agreement with the data obtained by the Environmental Protection Agency.

...Chart No. 7...

Analytical results alone tell only part of the story of the impact of the river on Escambia Bay. This table shows the average pounds per day of the indicated material flowing down the river above Monsanto for the first 10 months of 1971. It is apparent that large quantities of organic carbon and total nitrogen have reached and are reaching the bay through the river.

...Chart No. 8...

The theoretical oxygen demand calculated from TOC and oxidizable nitrogen has averaged almost one million pounds per day with some 96 percent of the TOD due to organic carbon.

MR. TRAINA: Mr. Lipe, can I interrupt at this point to just ask for clarification?

MR. LIPE: Yes, sir.

MR. TRAINA: Is this based on average daily flows over the whole 1971 hydrological period--

MR. LIPE: They are based on average daily flows from average to monthly--computed and totaled as to monthly averages for the 10 months of 1971, Mr. Traina.

MR. TRAINA: Sort of an average annual figure?

MR. LIPE: Yes, sir.

...Chart No. 9...

The next chart shows the three measures of oxygen demand, 5-day BOD, chemical oxygen demand, and theoretical oxygen demand. Two points here are important. First, the COD, or chemical oxygen demand, results agree well with the theoretical oxygen demand calculated from organic carbon and oxidizable nitrogen. Second, and more important, is that the 5-day BOD measures less than 5 percent of the total oxygen demand in river water.

Unlike sanitary waste streams often encountered and Monsanto's effluent where 5-day BOD measures a large percentage of the total demand, the river contains large quantities of organic materials which are only slowly oxidizable and thus not measured by 5-day BOD.

Previous sessions of the conference have reported that materials in the river tend to be trapped in the upper portion of the bay. These slowly oxidizable materials accumulate and contribute to long-term oxygen depletion of the bay water. Use of the 5-day BOD analysis leads to serious underestimation of this total oxygen demand and consequently is not a meaningful analytical tool for either study or control purposes in understanding the oxygen dynamics of the bay.

We urge that the conferees adopt TOC and TKN as the measures of oxygen demanding materials. If for technical reasons these tools cannot be used, then we recommend that COD replace BOD_5.

...Chart No. 10...

The TOC analysis has several advantages over BOD_5. First, it is a rapid analysis. There is no five-day delay. TOC can be monitored continuously and in the case of Escambia River and Bay is a much more meaningful and definitive tool.

... Chart No. 11...

We have been considering the chemical components in the river. However, let's turn to the physical, specifically solids. This chart shows the solids analysis for 1971 based on samples taken above Monsanto at monthly intervals.

...Chart No. 12...

The total solids load has averaged over two million pounds per day with over 800,000 pounds per day of volatile solids. Perhaps in considering Escambia Bay the more important index is suspended solids, since most of this material might be expected to settle out and become part of the sediment in the bay. I call to your attention that an average of a quarter million pounds per day of suspended material as measured above Monsanto has entered the bay from the river in 1971.

...Chart No. 13...

A further look at the suspended solids shows that over 25 percent of it is volatile material, indicating a high organic content, and probably a major part of the high oxygen demand sediments found in the bay.

...Chart No. 14...

Now I would like to show a comparison of the river above and below Monsanto. Gentlemen, I think you have to look quite closely to find the difference between those two columns. In no case does Monsanto's present contribution significantly increase the contaminant load in the river.

...Chart No. 15...

This conference in the past has been concerned with thermal loads to the river. This is a sketch, and this was discussed at some length yesterday, of the Escambia River in the vicinity of Monsanto. Above the plant the river splits with the Escambia flowing past the plant and the White River flowing on the east side of Brosnaham Island. Below Monsanto the rivers flow together to form Escambia or the lower Escambia.

The temperature data shown here is taken from a report by Dr. Thomas Hopkins issued in 1969. These values are surface temperatures and show the maximum effect of our cooling water discharge. Our own data confirms the studies of Dr. Hopkins and I should say also confirms the presentation made by Mr. Linne yesterday with regard to the temperature effect of Monsanto's discharge on the river.

...Chart No. 16...

Although all the evidence indicates Monsanto's present discharge is insignificant, we presently have work under way to make further changes in two areas. We are in the design stage of a project to reduce the TOC in our discharge by some 30 to 50 percent, and second, we are conducting feasibility studies of ways to reduce the temperature of our cooling water discharge hopefully by 60 to 70 percent.

Now let's take a look at some of the past history of the Escambia River.

...Chart No. 17...

This chart shows the average river flow in thousand cubic feet per second on an annual average basis for the past six years. It is clear that 1968 was a low flow year and that 1971 was a wet year.

We have for years run COD analysis, but only for the past 18 months have we had the capability to run TOC so that the data I will present here is in terms of COD.

...Chart No. 18...

This shows the average annual COD concentration of Escambia River water above Monsanto for the same period, 1966 to 1971. Notice that there is a distinct upward trend of COD concentration. One would assume that this might be true for other parameters.

...Chart No. 19...

This chart represents monthly averages for the same period and gives a closer look at the COD content in the river above the plant. The average COD for the 6-year period is 21 ppm. Notice that the last three years are at a distinctly higher level than the first three.

... Chart No. 20...

This chart shows the average annual lbs/day loading of COD in Escambia River above Monsanto. The combined effects of flow rate and COD concentration are apparent. The low in 1968 was a little under 200,000 lbs/day compared with 1971 averaging 900,000 lbs/day.

...Chart No. 21...

To indicate further the true nature of the problems we face at this conference, consider these trends in COD loads for the past three years. In 1969 the river COD load was 466,000 lbs/day. In 1969 Monsanto discharged 10,400 lbs/day of COD or less than 2.2 percent of that in the river. In 1970 the river COD load above Monsanto increased by 159,000 lbs/day. The upstream increase alone was 15 times Monsanto's total 1969 discharge level. While this increase in the river was taking place upstream, our discharge decreased 3,000 lbs/day. In 1971 the river load increased by another 275,000 lbs/day to a total of 900,000 lbs/day. This increase alone was more than 90 times our 1970 discharge rate. In 1971 our plant discharge was reduced by 1,600 lbs/day so that in 1971 we contributed only 0.6 of 1.0 percent of the total COD in the river.

...Chart No. 22...

Here is the data for the past six years. Each bar represents 100 percent of the total river COD load for the year noted and the shaded area represents the fraction contributed by Monsanto. In none of the past six years has our COD contribution been more than a small fraction of the total. Even in 1968 when the river load was low, Monsanto contributed 6 percent.

The data we have been reviewing is for the Escambia River above Monsanto. The river represents only one of many sources of pollution to Escambia Bay that have previously been ignored. While the other sources probably are not of the same magnitude as the Escambia River, they cannot be overlooked. It is also our contention that Escambia Bay cannot be considered independently of the other bays and bayous in the area. They do, after all, make up one body of water and any change in water quality in any part of the complex will affect the entire complex.

When the presence of other unaccounted for sources of pollution in the bay is considered, the fraction of the total effluent entering Escambia Bay which comes from Monsanto is entirely insignificant. Gentlemen, even if the plant were completely shut down, no meaningful improvement in the bay would be seen.

The State of Florida's reasoning in attempting to order complete removal of industrial discharges is inconsistent with the record of previous sessions of this conference. The State has indicated that even though substantial reductions in pollution by industry have been accomplished in the past two years, fish kills have continued and no signs of enhancement of the bay are noticeable.

The record of the first session of this conference indicates you cannot expect almost immediate recovery of the bay even if all artificial sources are eliminated and so far the State of Florida and the previous sessions of this conference have dealt with only a few of the artificial sources, not all of them. The fact has been consistently ignored that agricultural runoff, storm drainage from populated areas as well as State and Federal installations, and changes in drainage due to real estate development, urban expansion, highway construction and storm sewer design are all artificial sources. Many of these are controllable and failure to consider them as such for whatever reason is an oversight and inconsistent with the stated desire for enhancement of the bay.

The State Department of Pollution Control has stated in the 1971 year-end report that, and I quote, Massive amounts of carbonaceous matter and nutrients are present in Escambia River at the Alabama-Florida line, unquote. How can removal of trace amounts improve the bay with a large and increasing load coming from other sources? We have presented data that indicates a very significant load in Escambia River above Monsanto. We are concerned that the bay cannot recover so long as this and other overlooked and uncontrolled sources are permitted to continue.

Monsanto entered into the record of the first session of this conference two years ago information concerning the large pollution load in Escambia River above Monsanto. The conferees at that time took no action on this information and placed almost total responsibility for pollution of the bay on five selected sources which at that time were, based on the reported data, contributing less than 7 percent of the organic pollution in the bay.

In December of 1970 we provided additional information on the river load to the Florida Department of Pollution Control.

At the second session of this conference in February 1971 the Environmental Protection Agency reported TOC analysis in the Escambia River above Monsanto but did not carry through and indicate the large organic loading of nearly one quarter of a million lbs/day in the river that their analysis represented and the conference again placed total responsibility on the same five selected sources.

In July 1971 we again provided information of the Escambia River to the Department of Pollution Control.

And finally, in September 1971, only four months ago, the Department publicly acknowledged that Escambia River above Monsanto was a major source of pollution.

I am not by any means trying to indicate that the five selected sources were not contributors to the problem, but the total concern of the earlier sessions of this conference was clearly that these five contributed nearly 100 percent of the pollution and that control of these five sources would solve the problems of the bay. The data presented here I think shows this to be untrue.

Perhaps everyone concerned can look at the situation with an open mind and throw out their misconceptions. Some of the other sources must be acknowledged and corrective action taken if we are going to solve the problems of Escambia Bay.

Gentlemen, it is and has been Monsanto's policy to take whatever action is necessary to protect the river and the bay from any adverse effect due to our discharge. Our record on this is consistent and clear. We have outlined plans to further reduce our discharge, but we know that even complete shutdown of our plant would not improve the situation in Escambia Bay. We further believe that the problems of the bay will never be solved unless all concern themselves with all the sources of pollution rather than continuing to concentrate on politically popular targets such as Monsanto.

In conclusion we urge this conference to:

1) Adopt TOC as the most meaningful measure of organic pollution;

2) Recognize that there are sources of pollution to Escambia Bay which have not received attention;

3) Adopt recommendations that will have a meaningful effect in solving the Escambia Bay problems;

4) Base its recommendations on technical and scientific fact regardless of the political implications.

Monsanto has publicly expressed its concern for the Escambia River and Bay. We have heavily committed our technological and monetary resources to convert that concern into meaningful action. We are prepared to assist in further definition of the existing problems and to help in determining feasible solutions. To this end we would endorse Air Products proposal of yesterday for a joint technical council for problem definition.

Thank you, gentlemen.

MR. WHITE: Thank you, Mr. Lipe.

Let me make one point clear. There are no political decisions that have been made by this conference or anyone else that I am aware of associated with the conference in any way.

I think you have added a good bit for comment that I am sure some of the other conferees will get to. I would like to make a statement on your statement concerning TOC. You brought a smile to Mr. Traina's face. This was recommended in the original conference as a load limit. At the second session of the conference it was decided that the technology was not here for us to base treatment requirements on TOC. However, the conferees did recommend that all discharges monitor TOC and that we build up this file so that we could make decisions based on TOC.

I would like to ask, and maybe you went into it, but where you stand with respect to meeting the conference recommendations which I feel were supported by the facts and a technical report that was presented to the conference and these that I refer to are the BOD loading of 605 pounds, the total nitrogen of 248, and the total phosphorus of 46 pounds.

Can you give us a progress report on that, where you stand and if you will achieve it?

MR. LIPE: Monsanto's discharge level is represented by the percentage reduction figures that I gave in the report, Mr. White. The 99.2 percent TOC is equivalent to 2,000 pounds per day discharge level. The BOD figures, I believe it was indicated on the chart, represented about 2,200 pounds per day.

MR. WHITE: You have lost me. Would you run through that again, now?

MR. LIPE: I say the BOD, BOD_5--

MR. WHITE: Yes.

MR. LIPE: --in the effluent of the Monsanto plant as indicated on our progress chart, the second chart that I presented, equates to around 22,000 or 2,200 pounds a day.

MR. WHITE: Twenty-two hundred.

MR. VICK: Twenty-two hundred.

MR. LIPE: I am sorry, yes. Wrong numbers. And total nitrogen, as presented by the second chart, we are now at a level of approximately 500 pounds per day.

MR. WHITE: Possibly you misunderstood me, then. Is the company planning to meet these effluent limits that were established?

MR. LIPE: Mr. White, we do not know any way to achieve 605 pounds a day of BOD loading in our discharge.

The total nitrogen, here again I say we are currently at 500 pounds a day. We feel that there is a good possibility of reducing this number probably by another 10 to 15 percent. Beyond that and continue operation of the plant, technologically we don't know how to remove the remaining quantities.

Phosphorus we are at approximately 40 pounds per day.

MR. WHITE: I just want to clarify one other point.

On Chart 5 you talk about your percent overall removal efficiency. Now, you are counting in that your total discharge that partly goes in the deep well, is this correct, or am I wrong on that?

MR. LIPE: That number is based on those parameters generated within the plant as compared to that amount that gets into our effluent, which, yes, it does include that that is disposed of through subsurface well disposal, Mr. White, in the removal efficiency calculation, yes, sir.

MR. WHITE: Of course there was another thing in the report made yesterday about the BOD loads in the river and we couldn't get any statement from Mr. Little as to what this translated to. But the BOD concentration below Monsanto was double in the river during this recent sampling period over that station above the plant.

MR. LIPE: Mr. White, I am glad you brought up that point because I believe I am right in that these samples taken below plant were taken at Highway 90 Bridge, which is essentially brackish water area most of the time. Two of these samples that indicated the highest BOD content also indicated very high chloride content, which would suggest that that was bay water, not river water. The third sample that indicated a low chloride content also had a low BOD value, which I think would be more indicative of the river water quality and indicative of that material that is below Monsanto.

Our data taken at a point, oh, some two miles above Highway 90 Bridge, which we monitor on a continuing basis, indicates a BOD level of 0.1 to 0.2 above background.

MR. WHITE: Any comments or questions?

Mr. Crockett.

MR. CROCKETT: I have really the same question that Mr. White just asked you about whether your percentage removal of TOC included the discharge into the ground. Now, can you tell us just what percentage of TOC removal you are attaining by treating your discharge to the river?

MR. LIPE: Mr. Crockett, all treatment and removal takes place prior to our discharged effluent. We do not treat our effluent stream as such because roughly 95 percent of that water is cooling water, river water passed through the plant for once-through cooling and is returned to the river, so that stream is not treated as such, it is treated prior to anything getting into that outfall stream.

MR. CROCKETT: But the 99.2 percent represents a percentage figure determined by taking, I presume, the concentration of pounds of TOC in your waste prior to treatment and the same concentration or number of pounds in what goes into the river, right?

MR. LIPE: Yes, sir.

MR. CROCKETT: Well, can you tell us, then, how much--what I am trying to get at is how much efficiency through your--what is the efficiency of your treatment system exclusive, your surface treatment system, in removing TOC?

MR. LIPE: I don't quite--

MR. CROCKETT: You don't quite follow me?

MR. LIPE: Yes, sir, what you are--

MR. CROCKETT: Let me see if I can say it in a--

Let's assume that you take the pounds of TOC prior to treatment and then the pounds of TOC that are discharged on the ground and the pounds of TOC that are discharged to the river, then you could come up with a percentage of what your surface treatment is doing, couldn't you?

MR. LIPE: Mr. Crockett, we do not have a conventional treatment system in our plant. We have a physical chemical treatment and we treat each waste stream independently prior to collection and transport to our subsurface waste disposal system. The numbers that you have there are the average pounds per day of TOC or BOD or other parameter that is generated within our waste streams on the plant--

MR. CROCKETT: Well, Mr. Lipe, you have--

MR. LIPE: And taking those values that find themselves in our effluent and the removal efficiency of those is the difference.

MR. CROCKETT: You have recommended that TOC be used as the parameter to determine waste loads, I don't know whether those are your words or not, and what I am trying to get at, if you are going to make that recommendation maybe you ought to have or would have some information on just what you are able to do in removal of TOC. I don't find any--you have got a lot of other things listed in here in terms of pounds of what you are discharging to the river, and I may have overlooked it, but I didn't find TOC and how many pounds you are discharging today.

MR. LIPE: I hope I didn't mislead you in recommending TOC to be your measure of treatability, but it would be a control measure, our recommendation was use TOC for control because we felt--

MR. CROCKETT: Yes.

MR. LIPE: --it was a more meaningful term in relation to the bay and to the--

MR. CROCKETT: But wouldn't you say if you are going to measure it that way that you would have to go back and include it in your analysis of an efficiency of the treatment plant?

But coming back to the point, you do not have the figure of TOC that you are discharging today?

MR. LIPE: Yes, sir.

MR. CROCKETT: You do have it here?

MR. LIPE: Yes, sir, 2,000 pounds a day.

MR. CROCKETT: Well, I missed it.

One other question. Where is your upstream station located in reference to your discharge in terms of distance?

MR. LIPE: Our upstream station is located approximately one and a half to two miles north of the plant and our downstream location is approximately a mile south of the plant.

MR. CROCKETT: Do you have any tidal effects there?

MR. LIPE: From time to time--or occasionally, yes, there is some minor tidal effect, Mr. Crockett.

MR. CROCKETT: Would you have any conception of what a normal, healthy, clean stream would contain with reference to

TOC in a concentration?

MR. LIPE: No, sir.

MR. CROCKETT: So you wouldn't know whether the figure you reported, the average figure, I believe 9-something, was representative of that or not?

MR. LIPE: You mean the pounds per day?

MR. CROCKETT: I am talking about concentration. I was trying to get the concentration, if you had any idea or concept or knowledge as to what a normal unpolluted stream, healthy stream, would contain with reference to TOC and you said no, and then I came back and asked you that in that case that you would not know whether the average figure you reported of 9 ppm is representative or not. Is my assumption correct?

MR. LIPE: Yes, sir, your assumption is correct, because--

MR. CROCKETT: I was interested in the same thing that Mr. Traina asked you, is how you came to a pounds per day, and I guess I missed your answer. On this information you have presented in the chart, how many samples serve to be the basis or do you sample daily? Do you sample the river daily or weekly or monthly?

MR. LIPE: For what parameter, Mr. Crockett?

MR. CROCKETT: For the ones that you have reported here, TOC, BOD, and others. In your river stations, how often do you sample?

MR. LIPE: We sample the river at least weekly and sometimes--

MR. CROCKETT: At least weekly?

MR. LIPE: Yes. And some parameters we sample it daily.

MR. CROCKETT: Did you compute on the basis of flows--I presume it would have to be the USGS flows reported at--

MR. LIPE: Century.

MR. CROCKETT: --Century?

MR. LIPE: Yes, sir.

MR. CROCKETT: You computed the pounds that those concentrations represented on the basis of that flow--

MR. LIPE: Yes, sir.

MR. CROCKETT: --for the particular day you sampled?

MR. LIPE: Yes, sir.

MR. CROCKETT: And you computed your average on that basis, am I correct in that? Or if not, how did you compute it?

MR. LIPE: The average daily flow summa--I mean average for the month on a monthly basis, yes, sir, to give you the average river flow based on our sample results.

MR. CROCKETT: Rather than taking for each day you sampled and the flow for that day and calculating it that way and determining the average in that manner, you took the monthly average?

MR. LIPE: A weighted monthly average, yes, sir.

MR. CROCKETT: I have no further questions.

MR. WHITE: I believe Mr. Levin has a few questions.

MR. LEVIN: First of all, let me say to the other members of the Federal-State conference that I am sure Mr. Lipe's remarks concerning politics didn't have anything to do with you all. For the life of me I can't quite figure out why it would be politically smart to jump on these five sources. I can't figure that out yet, Mr. Lipe. It would seem like to me it would be a whole lot smarter for me to sit back and not do anything and blame it on something up in North Carolina if I possibly could, but that is neither here nor there. I expect if I can't stand the heat I ought to stay out of the kitchen. If you all want to say this is politically inspired, that is perfectly all right with me.

I tell you why we look at--why I look at these five sources. I can't tell you why they do. Any time that we hear that there are other rivers similarly situated to Escambia

River that are comparable to Escambia River and the results, the disastrous results which have taken place on Escambia Bay, which have obviously occurred--and I don't care what this man from Pennsylvania said, nobody in the world is going to make me believe that Mother Nature picked on Escambia Bay to control the menhaden population. I just can't go that route. I mean I don't think anybody eight years old would believe that.

Anyhow, if the flows down these other rivers have not contributed any disastrous problems in these other estuaries and all of a sudden we have one here in Escambia Bay, then what else can you look at except those extra additions that are added to that which are ordinarily found in these other rivers, you see. And quite frankly, I would like to express my thanks for your offering to participate in a study of this bay and this river and what the problems are. We have got studies coming out of every nook and cranny that I know of, but still maybe another one would help, I don't know. And I certainly think that that would be good.

I was wondering, could you tell me about how much money you all are talking about in dollars and cents that you all would be willing to contribute toward this study?

MR. LIPE: No, sir, in terms of dollars and cents I am not in a position to give you a commitment this morning, but in terms of effort and expertise and our staff, I can--we are--

MR. WHITE: Would you speak into the microphone, please?

MR. LIPE: Oh, I am sorry.

Yes, we are, and I tried to indicate here this morning, Mr. Levin, we are interested in this thing and my purpose in being here is to bring to this conference information that I think is pertinent to the real solutions of the bay and that is the purpose, no other reason, for presenting the information.

We have, I think, a highly qualified staff of people in Monsanto and we have experts, we have, certainly, very sophisticated capability within the plant here from an analytical standpoint, and we offer these services, make these available to you and to the agency to help define these problems and to find a cure to the Escambia River and Bay problem.

MR. LEVIN: Is it engineeringly possible for you all to get rid of your discharge through your deep well instead of into the river? And still maintain your production, I am talking about.

MR. LIPE: There are some very significant problems associated with that, Mr. Levin, and at this point in time,I am not a geologist, and I could not and certainly would not speak from that standpoint. I think we would have to have geological experts to help us determine if that were feasible.

MR. LEVIN: Would you do this for me?

MR. LIPE: My thoughts are that there would be--I know that there would be some very major problems associated with this and to commit that type of--to that loading I think would be questionable. Here again I think we need to call in the experts on that, and I am not a geological expert in any--

MR. LEVIN: Mr. Lipe, you all haven't hired one of these northern experts, but what do you think is the problem with the 8 foot of sludge that we have got out there on the bay and these fish kills, and so forth? What is your view?

MR. LIPE: I think I have expressed our position in this, Mr. Levin, here this morning, that we think that, sure, there are five sources that have been identified as five sources that the conference has given its attention to for the last three years, but I think there are other major contributing sources, maybe not point sources, see, that are making a major contribution to the eutrophication of this bay, and that until we can define the total input and how it can be controlled, and it may not be easy, it may be of course extremely difficult, but technically I think there are--there is--there can be applied the technology to find the ways and means of controlling eutrophication in this bay.

MR. LEVIN: I don't know whether I got the answer to my question or not.

MR. MAURIELLO: Can I--

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: Let me follow that trend here a minute, Jim.

I think what you are saying, if I understand you, is that you agree that eutrophication in the bay is the problem.

MR. LIPE: Yes, I think that there has been sufficient testimony to that.

MR. MAURIELLO: We all, I think, feel that eutrophication stems from four basic factors, one being the introduction of phosphorus, another being nitrogen, and the other being carbon, which go to make up, combined with sunlight and several other physical factors, the eutrophication that we have.

Of the three main contributors, namely phosphorus, carbon and nitrogen, how much of--let me see if I can get my question worded properly. These are controllable factors, are they not? Sunlight you cannot control.

MR. LIPE: Right.

MR. MAURIELLO: Is it true, then, in your mind that the three controllable factors, carbon, phosphorus and nitrogen, should be controlled?

MR. LIPE: Yes, sir.

MR. MAURIELLO: O. K. The trend, then, I think that the conferees have is let's take the three controllable factors that you can physically pinpoint and get rid of these as much as possible. Now, you say that there are other uncontrollable factors. What is your thinking in regards to these? How are we going to control these?

MR. LIPE: Mr. Mauriello, I would like to repeat, now, the comment that I made earlier about the five identified sources or the five key sources based on the 1970 conference report and if, I am quite confident, the data that I presented this morning on chemical oxygen demand is valid, that these five sources only contributed 7 percent of that total. And my point is that we have got to find and identify and find some way of controlling the other 93 percent because 7 percent is not--7 percent is important, but 7 percent is not the controlling--is not the way to control the carbon and nitrogen and phosphorus into the bay through the 7 percent effort. We have got to find those other percentages of that 93 percent that are making--finding their way into this bay and find some way of controlling those too.

MR. LEVIN: Mr. Lipe, the thing that bothers me is why is it, if you just take a look at Choctawhatchee Bay--and maybe I am comparing apples with oranges, I don't know--but why if the same stuff is coming down that river feeding into Choctawhatchee Bay have they not met with the same environmental disaster that we have met with here in Pensacola if it is not the addition of what the industries put into that bay that is contributing to it? I don't understand it.

MR. LIPE: I can't answer your question because I have no data on a comparative basis.

MR. LEVIN: They told us yesterday that the studies showed that the same thing is coming down every river. Why is it that they haven't had that problem over in Choctawhatchee Bay that we have got here in Escambia Bay?

MR. LIPE: I wish I had a glass--

MR. LEVIN: Why don't we have the same problem in East Bay that we have got in Escambia Bay? If somebody could clear that up for me, then maybe I would agree that Mother Nature has picked out Escambia Bay to help them.

MR. LIPE: I can't answer that question.

MR. LEVIN: Well, neither can I. (Applause.)

MR. MAURIELLO: I want to ask another question.

MR. WHITE: Fine.

Go ahead.

MR. MAURIELLO: Jim, is it your opinion that if all of the five sources were completely eliminated today, and let's say within a year, that we wouldn't have any problems in Escambia Bay or would we still have the problem because of these unknowns that you are--not unknowns but unidentified sources that we are talking about? Is this what you are-- I am not sure that I understand what you are saying.

MR. LIPE: No, I did not say that if these five sources were eliminated that we would not--or we would continue to have the problem. My reference--

MR. MAURIELLO: Do you think that we would have?

MR. LIPE: My reference is only to the most knowledgeable area that I have and that is Monsanto, that if Monsanto was eliminated that I did not feel or did not believe that the problem would be corrected.

MR. WHITE: Mr. Levin.

MR. LEVIN: Let me say one more thing and then I am going to hush.

Jim, God knows that the State of Florida wants to cooperate with you. I mean I have made it just as clear as I can possibly make it as late as last Friday. You all contribute 8,000 payrolls. It is not politically feasible or smart for me to be sitting here trying to push and push and push. Like I said, that is just not smart at all.

But I took an oath that I have got to--otherwise I might as well quit. And as I see it, based on the questions that I have in my mind, we have got to keep working and cooperating to try to get this thing solved just as soon as we possibly can. And let me tell you that politics don't have a thing in the world to do with it.

MR. LIPE: Mr. Levin, I agree wholeheartedly. We represent about 25,000 people in this community and our concern is just as real as yours.

But my point is, and again I go back to it, that based on reported data, even in 1970, which was probably our worst year, from a total discharge standpoint of the 7--of the 5 identified sources, point sources, in 1971, that we are talking about less than 7 percent of the total chemical oxygen demand load in the bay. Now, we need to do whatever is necessary to define the sources of these and try to bring about control. I think when we do we will see a restoration of the bay. And that is the point of concern and that is my only reason for bringing this information to the conference.

MR. WHITE: Let me assure you that the Environmental Protection Agency is well aware of the problems associated with runoff and is maybe belatedly getting into the game, but efforts are going in this direction. Now, if you have got any solutions for us, we would be happy to hear those, because--

MR. LIPE: Mr. White, I realize they are much more difficult than controlling a point source.

MR. WHITE: --this is an extremely complex problem when you are talking about a 4,000--how big is the basin, I don't know, 4,000 square miles? It is just a problem that you can't come to grips with.

But Mr. Levin also made the point that I think concerns the conferees, why isn't this happening in other bays, and this is the thing that concerns us. And I don't think that anything has been presented that answers that question adequately, at least so far.

Mr. Traina.

MR. LIPE: I would hope that the expertise in the Environmental Protection Agency can define these differences.

MR. WHITE: Well, I hope so too.

Mr. Traina.

MR. TRAINA: Mr. Lipe, let's get down to some technical matters.

First let me say that I think the information you have provided is very good. I would personally like to compliment the company on the river data and I would like the record to show that, for what it is worth.

However, I think that perhaps--again let me ask some questions. You talk about COD. Now, I notice in the charts, of course your COD has been going up almost directly proportional to the flow since 1968.

MR. LIPE: No, sir.

MR. TRAINA: Pardon?

MR. LIPE: No, sir.

MR. TRAINA: That is not the case?

MR. LIPE: Not directly proportional.

MR. TRAINA: But the flow has been increasing from 1968, the average annual flow in the COD has been increasing, so I think that perhaps it is not all due to some discharges upstream.

The other clarification I think that needs to be made, that, of course, with COD you are measuring the total oxygen demand, as we all know, with the test, and as I think the point was made yesterday by Mr. Little, there is a difference in terms of eutrophication between a leaf and some fertilizer. They might both have the same COD, but their effect on eutrophication is quite significantly different.

All right, with those general comments out of the way let me ask you some specific ones and that regards your discharge.

Now, as I understand it, presently your BOD is down to 2,200 pounds per day with a TOC of about 2,000 pounds per day. This conference has required that these figures be reduced in terms of BOD to 600 pounds per day. Now you are telling us that you think this is not achievable?

MR. LIPE: Yes, sir.

MR. TRAINA: All right, let me ask you this, sir. We heard yesterday from Mr. deCastro regarding the orders of the State of Florida requiring 90 percent treatment of your deep well effluent. What would you anticipate when you install your 90 percent treatment of your deep well effluent will be the reduction in BOD?

MR. LIPE: We have not finalized our position in regard to that. Treatment of deep well wastes is part of the question that Mr. Levin answered earlier and there are some major problems related to that area that we have to get into and have to discuss and have to make the Department of Pollution Control aware of.

MR. TRAINA: But you are under orders for 90 percent treatment and I assume that 90 percent relates to BOD. Is that true, Gil?

MR. MAURIELLO: Right.

MR. TRAINA: And you haven't made any estimates what that will result in a BOD reduction, is that it?

MR. LIPE: Mr. Traina, that BOD reduction has nothing to do with the river at all or the bay. That is an entirely separate question, is not related to the water quality of the bay or the river.

MR. TRAINA: I see. Well, did I understand you to say, though, that this 2,200 pounds is your total?

MR. LIPE: That is the total discharge to the river.

MR. TRAINA: I see. In addition to that there is additional BOD being discharged into the ground?

MR. LIPE: Yes, through subsurface disposal.

MR. TRAINA: I see. And you have no estimate of what that figure is?

MR. LIPE: The BOD levels?

MR. TRAINA: Yes.

MR. LIPE: Or the measurable parameters of the waste being--

MR. TRAINA: Pounds of BOD you are putting into the ground now.

MR. LIPE: Certainly, we know exactly what it is.

MR. TRAINA: Would you care to tell us?

MR. LIPE: I don't think it is pertinent to the problems of the bay, but for your information it is 250,000 pounds a day.

MR. TRAINA: I see. O. K.

Now, the other question comes, couldn't you reduce your BOD, this 2,200 pounds per day, have you considered reducing that by putting some of this waste stream into the ground?

MR. LIPE: Mr. Traina, we have spent a great deal of time and effort and energies trying to find ways and means of reducing the BOD level to the point where we are. It is not an oversight or not neglect that it is that level. It is through a great deal of effort we have been able to reduce it to that level.

MR. TRAINA: I realize that, sir, but we have got a figure here and we are trying--we went through this yesterday with the other company. We are trying to establish how we are going to meet these. Now, I can appreciate the technical and other problems that people like yourselves face, but we have got to all get into this thing to reduce these levels.

MR. LIPE: We only know one way for sure to reach the 605 pounds a day and that is to cease operation, and that is just about that--as far as--it has reached that point. We know of no other way to reduce our loads beyond what I projected this morning. Now--

MR. TRAINA: Based on the figures, based on the BOD generated and TOC generated figures that we had available to us two years ago, to bring it down to this level I think only represented a 90 percent reduction.

MR. LIPE: No, sir, that represented a 94 percent reduction--

MR. TRAINA: Excuse me, sir, you are absolutely right.

MR. LIPE: --from that point at which the conference convened. It did not take into consideration any--the BOD generated by the facility as is normally considered when you calculate treatment efficiency. It did not take into consideration any BOD or any credit for treatment prior to December or January of 1970 at which point the 10,000 pounds was the target and it was 94 percent of that, not of the plant generated load. So that makes it 99.8 percent removal if you consider the 94 percent--

MR. TRAINA: So it would seem to me that it would try to focus attention on in-plant controls. What has the company done in this regard?

MR. LIPE: This is the--through in-plant controls, improvement in physical chemical treatment and separations and handling of the waste streams in the plant is the means by which we have achieved the reductions that we have reported.

MR. TRAINA: And you don't feel that there is anything you can do further in terms of in-plant controls or treatment modifications to reduce it any more?

MR. LIPE: Not any major or significant reductions, Mr. Traina. Certainly we have indicated we feel that we can achieve another 20 to 30 percent reduction and have work under way or have design under way to achieve that as rapidly as possible, but beyond that point we don't know of any other way.

Mr. Traina, going back to the raw waste load, 250,000 pounds a day, 2,000 pounds a day is what, less than one percent that we are talking about, in excess of 99 percent removal at the current time presently.

MR. TRAINA: But there is no way of getting that 2,000--I mean that is the part that is entering the bay, you see, that is the real problem.

MR.LIPE: I wish we could and I assure you that if we can find a way we will reduce it to whatever extent possible, but at this point in time it would be untrue for me to stand up here and tell you that we could get another 1,500 pounds--

MR. TRAINA: Do you feel the same is true of the TOC, that this 2,000 or approximately 2,000 pounds is your irreducable minimum on TOC?

MR. LIPE: We are approaching it.

MR. TRAINA: Well, I regret that we have come to an impasse on this thing. I would hope that--

MR. LIPE: We are not coming to an impasse only from the standpoint of capability.

MR. TRAINA: Thank you, sir.

MR. WHITE: Just a couple of quick questions and then Mr. Mauriello has one and maybe we will move along.

Your flow at the plant, and I am looking at some figures that I believe were reported on your permit application, you discharge 43 million gallons per day, is this correct?

MR. LIPE: The outfall, yes, sir.

MR. WHITE: And bring me up to date on this. You have no treatment of this? I mean on the outfall alone. Now, I am just trying to clear it up in my own mind.

MR. LIPE: This problem comes up at every session of the conference.

MR. WHITE: Yes.

MR. LIPE: Our outfall is approximately 95 percent river water. We use river water for once-through cooling for part of our process.

First let me back up. Approximately 85 to 87 percent of our cooling is through the use of cooling towers and recirculated water system. Because of the nature of the process used, cooling water temperatures are too high for the process control capabilities, so on those bases we use river water, and the 95 to 97 percent of our outfall flow is once-through river water that has not been in contact with any processes in the plant. So that makes up the biggest volume of our outfall.

MR. WHITE: Yes.

MR. LIPE: So the other three to five percent are miscellaneous steam condensate and water streams that are a part of the process. Now, does that help you--

MR. WHITE: Could that not be separated?

MR. LIPE: Not in its entirety, Mr. White.

MR. WHITE: O. K.

Mr. Mauriello.

MR. TRAINA: May I make just a suggestion or a comment here?

MR. WHITE: Sure.

MR. TRAINA: We have got into these really technical problems in other places and it may be appropriate here and I would just like to throw it out and maybe discuss it later, perhaps to have an in-plant review with State officials, our technical people from our Cincinnati operation, to go through this plant to see where we can, you know, tighten up this thing. You know, I can appreciate the efforts that you have put into it, but I hope you can appreciate the fact that we need to, you know, reduce these levels. Maybe we can just, without making commitment here, but maybe Mr. Lipe can consider this, maybe we need to get some, you know, real highly trained technical people from our facility, from the State, from your company to go through your plant, you know, piece by piece, equipment by equipment, treatment device by treatment device, and see what we can come up with.

MR. WHITE: Would the company be receptive to having it?

MR. LIPE: We would certainly be happy to discuss it with you.

MR. WHITE: Mr. Mauriello, I believe you had a question.

MR. MAURIELLO: You asked part of the question.

The 2,200 pounds, Jim, that is being discharged is made up primarily of river water, once-through system?

MR. LIPE: No, sir. The 2,200 pounds is not river water. It is the plant's contribution to the river, the net plant contribution to the river.

MR. MAURIELLO: What I am asking is this, that the pounds are computed upon the BOD concentration and the volume of water and that volume of water is roughly 90 percent river water that you take at an intake, I mean it comes in your intake and then goes out once-through system, and this is not treated, then, it is just--is there any treatment? There is no treatment on this flow that is going back into the river?

MR. LIPE: No.

MR. MAURIELLO: It is strictly made up of that once-through system?

MR. LIPE: Plus the--

MR. MAURIELLO: Steam and all the condensates.

MR. LIPE: It might be appropriate--Joe, do you have the transparency on the plant topography?

MR. VICK: Yes.

MR. LIPE: This is a sketch from the USGS scale of the plant site in relation to its location on the river and also as indicated by the broken line is the plant property boundaries, and the dotted line that tends to make sort of a horseshoe around the plant and that goes outside the plant property and back represents a natural drainage basin through which normal stormwater and rainwater and other sources of groundwater find its way through the natural drainage contours, down through the plant property, and into our outfall.

Now, in addition to the process waste stream, our outfall contains our domestic sewage treatment effluent. And this entire drainage area, some 1,100 acres, is a part and finds its way into our outfall and becomes a part of our outfall flow. It makes some contribution from time to time, certainly, but it is also the most reasonable way of handling the drainage across our plant into the river.

That might clarify it.

MR. WHITE: Are there any other comments or questions?

MR. LEVIN: The only thing I want to suggest, if we could, I think the idea of additional study while we are working on this and Paul's idea of getting as many technical experts as we can, people that have no axe to grind one way or the other--

MR. TRAINA: Right.

MR. LEVIN: --to come down here and in the meantime if we can, since they are willing to cooperate--I don't mean that--to participate in the study, I assume that they would have no objection to Dr. Hopkins, Dr. Duke, who, of course, have spent a great deal of their life on this problem, I don't think we ought to let that slip by. I think we ought to get that going just as soon as we can while at the same time pursue this thing that you mentioned.

MR. TRAINA: David, if it is all right with you, we will just take the initiative here--

MR. LEVIN: I would appreciate that.

MR. TRAINA: --and set up a meeting date for plant visits, spend a few days going through the plant. We can check with your people in Tallahassee.

And Mr. Lipe, we will be back in touch with you.

MR. WHITE: We will discuss this with you soon.

MR. LIPE: O. K.

MR. WHITE: We appreciate your offer to have us in. Thank you.

MR. LIPE: Thank you, sir.

MR. WHITE: We stand recessed for 15 minutes.

(RECESS)

MR. WHITE: Let's go back in session, please.

Before getting started, we are continuing to have protracted exchanges and it looks like we are going to occupy most of the day getting through. In fact, it would appear now that we will run until 5 or 6 o'clock, as just a guess. If possible, I am going to ask you to tighten up on any presentation that you have. Of course if it is pertinent, we want to hear it, and I don't want to overly restrict anyone on this.

But it would help if we could move along a little more rapidly.

We will continue with the Florida presentation. Mr. Mauriello.

MR. MAURIELLO: Just in line with that, Mr. White, maybe to get a clarification as to who else, I still have on the list American Cyanamid, and I think Mr. Kenngott is here. And, let's see, the city of Pensacola, I thought I saw--right. And Mr. Lowery, is he still here, from Bream Fishermen? How about Mr. McGee from the Advisory Committee?

FROM THE AUDIENCE: He will be here shortly.

MR. MAURIELLO: And Commander Hunsley. And I don't believe I have missed anybody. I don't think there is any other indication of anybody that I have.

MRS. GUICE: I am Mrs. Guice.

MR. MAURIELLO: Mrs. Guice, who would you be representing?

MRS. GUICE: A citizen.

MR. MAURIELLO: O. K., I am sorry, I see it now.

Mr. Kenngott, American Cyanamid.

G. J. KENNGOTT, MANAGER

SANTA ROSA PLANT, AMERICAN CYANAMID COMPANY

PACE, FLORIDA

MR. KENNGOTT: Mr. Chairman, conferees, ladies and gentlemen.

I am G. J. Kenngott, Manager, Santa Rosa Plant, American Cyanamid Company.

First I would like to report Cyanamid's accomplishments with regard to orders for corrective action from the Florida Department of Pollution Control. Specifically, this is Case IW-227-69 issued July 18, 1969, as Order 18, and amended December 16, 1969, August 7, 1970, as Order 109, October 2, 1970, as Order 109A, October 20, 1971, as Order 331, and December 22, 1971, as Order 358. The first four orders were intended to obtain substantial reductions of discharges to the bay. The last two orders require complete elimination of contaminated wastewater discharge to the bay.

Cyanamid completed Items 1 and 2 of Order 109A and on August 4, 1971, requested a meeting to discuss implementation of Item 3, which read in part:

> Upon completion of Phase two and Phase three of the proposed project, this department will issue final orders setting

forth the allowable quantity of waste discharge and/or the percentage of treatment required.

This meeting was not held and the subject was no longer pertinent upon issuance of Orders 331 and 358. Cyanamid has requested a public hearing concerning Order 358 which would require complete elimination of contaminated wastewater discharges to the bay.

Secondly, I would like to report Cyanamid's accomplishments with regard to the recommendations of the sessions of this conference held in January 1970 and February 1971. The first recommendation of both sessions recommended 94 percent reduction of both carbonaceous and nitrogenous wastes and a 90 percent reduction of phosphorus wastes discharged to Escambia Bay. At the 1971 session, the recommendation concerning Cyanamid was more specific, namely, 425 lbs/day of 5-day BOD and 323 lbs/day of total nitrogen. Because Cyanamid's wastes contain very little phosphorus, no limit was recommended. These allowable waste loads were to be obtained by December 31, 1972.

Regarding these recommendations, Cyanamid believes the basis for establishing the limits for nitrogen and carbon were incorrect. We have discussed the reasons with the EPA in June 1970. Neither the EPA nor the FDPC has responded to our position.

G. J. Kenngott

Laboratory and pilot plant work done for and by Cyanamid has shown that the presently available technology can accomplish the major portion of the reduction desired but not the high reductions specified.

The first recommendation in 1971 also contained the following sentence, and I quote:

> If further investigation shows these limits are excessive...(Cyanamid)...must develop a plan to completely remove discharges from the Bay. Unquote.

We are not aware of any further investigations showing the limits recommended last year to be excessive. Nevertheless, FDPC Order 358 states:

> After December 31, 1972, no wastewater containing pollutants or contaminants shall be discharged into Escambia Bay from Respondent's facilities. Unquote.

The first recommendation in 1971 also contained a paragraph directing, and again I quote:

> All waste dischargers shall monitor effluents to ensure reductions and conduct feasibility studies and submit a plan of abatement for carbonaceous-organic-waste to the

conferees by February 15, 1972. Unquote.

We have identified the sources of total organic carbon in our wastes. The major contribution is expected to be drastically reduced by a process change which has been developed during the past two years and which we expect to implement in 1972. The next largest source has been reduced by two-thirds as a result of in-plant recovery and the remaining third should be removed during 1972. The remainder of the major TOC components will be disposed of via deep well in accord with the plan described to the FDPC on October 27, 1971.

The second recommendation of 1970 provided as an alternative the construction of a sewer collection system to intercept wastes. While Cyanamid is willing to cooperate in a joint study of this alternative, it does not believe it is its responsibility to initiate the study because of the relatively remote location of our plant and because the complexity of our waste indicates it may be better handled by self-treatment.

The sixth recommendation of 1970 was that Cyanamid shall immediately cease discharging acrylonitrile. As we reported in 1971, we have met this objective. Continued surveillance during the past year indicates no detectable acrylonitrile in our effluent to Escambia Bay.

To summarize:

G. J. Kenngott

1. Cyanamid now has an Order for Corrective Action from the FDPC for which the technology developed in compliance with previous Orders will not be adaptable. In addition, new technology must be developed for the changed Corrective Action. Under these circumstances, there is no practical way that we can meet the December 31, 1972, deadline.

2. Cyanamid, employing competent consultants and our own corporate environmental engineers, has been unable to demonstrate techniques capable of meeting the high levels of reduction of nutrients recommended by the conferees.

These are hard statements. I believe they are needed to emphasize that technology and time are not available to meet the laudable but, in our opinion, unjustifiable high goals set by both the conferees and the FDPC.

I would like to conclude on a positive and encouraging note. As a result of work done to meet the FDPC Orders and the recommendations of previous conferences, Cyanamid reduced chemical oxygen demand of our discharge by about 60 percent and the total nitrogen by about 40 percent. In addition, Cyanamid has developed a five-step plan which will enable us to limit our discharges of nutrients to Escambia Bay to levels substantially lower than at present and approaching the levels recommended by the conferees. This plan includes:

A) segregation and reuse, or separate disposal, of clean wastewaters;

B) extending source control practices to reduce pollutant loadings;

C) recovery of chemicals from selected streams via physical-chemical treatment;

D) disposal of selected strong wastes via subsurface methods; and

E) biological treatment of remaining weak wastewaters.

We know these lower levels can be reached much quicker than the goal of a highly restricted discharge or the goal of no discharge. We suggest that the nutrient reductions recommended for Escambia Bay be re-examined in light of contributions from all sources and in light of data from comparable bodies of water. We believe such a re-examination will lead to establishment of nutrient reduction levels which Cyanamid can meet with our recently demonstrated technology. Prompt agreement on these levels will permit Cyanamid to move quickly to further assist the rehabilitation of Escambia Bay.

Thank you.

MR. WHITE: Thank you, Mr. Kenngott.

Comments or questions?

Mr. Traina.

MR. TRAINA: Mr. Kenngott, thanks for your fine statement. It is very positive. Let me ask you one or two questions.

Do I understand your statement on page 3 to indicate that you will remove all TOC from your plant?

MR. KENNGOTT: No. No. We would remove the great majority of it.

MR. TRAINA: That relates, then, to the next question.

Say that you can approach levels that this conference recommended with implementing this five-step plan of yours. Could you give us an estimate of what those levels might be?

MR. KENNGOTT: In the order of 90 percent reduction.

MR. TRAINA: Could you give that in terms of pounds?

MR. KENNGOTT: In the area of both nitrogen and TOC I believe--I know with nitrogen I am correct, we could approach 500 pounds a day. In the area of TOC, I believe that same number holds, but I am not quite as certain of that.

I do want to point out that the recommendations of these conferees call for I believe 323 pounds of total nitrogen, total nitrogen, and I do want to point out that the 94 percent reduction was based on a calculation only for nitrate nitrogen, which is only one of three nitrogen components. And as we have stated before, and I state again, we feel that the original basis for establishing a 94 percent reduction limit was incorrect.

MR. TRAINA: Yes, we have gotten together on that point and I don't think it serves at this point in time to go through that.

MR. KENNGOTT: Except we have never had a reply.

MR. TRAINA: I think you had a reply in terms of the recommendations that the conference came out with last time.

But you feel that you can meet 500 pounds, approximately, for nitrogen and TOC. Would you like to comment on the BOD part of that?

MR. KENNGOTT: We have found that BOD is not a good measure. I think we would come, again, close to that 500 pound limit based on BOD, but, again, we feel the analytical method and the implications of that are not really most pertinent to this problem. But we would be in the order of 500 pounds a day.

MR. TRAINA: Again thank you for a very fine statement, Mr. Kenngott. And I also just indicate that I am glad you took care of that acrylonitrile problem that was reported last year.

Thank you, sir.

MR. KENNGOTT: Thank you.

MR. WHITE: Any other comments?

MR. LEVIN: I just want to ask.

You said in your report that you do not feel like you should participate in this study that has been proposed by Air Products and Monsanto?

MR. KENNGOTT: We didn't mention that at all, sir. Our proposal is before you. If a study is initiated we would certainly be happy to participate. This was not a subject which was given consideration. These statements were drawn up individually and we really didn't address ourselves to the study.

I would feel that your response might be that this thing has been studied to death and if you choose and the conferees choose to have further studies, we certainly would participate and be happy to.

MR. TRAINA: Would you also be amenable to Mr. Traina's suggestion that we have these experts from Environmental Protection Agency, and so forth--

MR. KENNGOTT: We will do anything we can to assist in this problem.

MR. LEVIN: Thank you.

MR. KENNGOTT: In summary, I would like to point out that by what I feel is a relatively minor revision of the conferees' recommendations and acceptance of that by the State that we can get to work fairly quickly in accomplishing the objectives that were assigned to Cyanamid.

MR. WHITE: Thank you, Mr. Kenngott.

MR. MAURIELLO: I have got just one question for point of clarification.

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: Just a point of clarification, Mr. Kenngott, that there are some--and I guess really for a matter of the record you make a comment here that there is expected to be some drastic reductions in the process changes which have been coming for the last two years and expected to implement in 1972. Any estimated date when this will be accomplished? Early 1972, mid-1972, late 1972?

MR. KENNGOTT: That is a difficult question to answer, for one reason. Our customers expect to receive fiber that doesn't change from day to day or year to year, and what we have had to do was make this change without changing our product and this has taken time and field evaluation, and the ultimate judgment in this will depend on our customers' reaction to the product that they now see. So if they accept it in April we can implement it three months later or four months. If they don't accept it until December, we are going to be pushed back that much further.

MR. WHITE: Anything else?

Thank you, Mr. Kenngott.

MR. KENNGOTT: Thank you very much.

MR. MAURIELLO: Mr. Mandy or--is Mr. Spriggs here with you, Mr. Mandy?

MR. MANDY: No.

MR. MAURIELLO: Or are you going to make the presentation for the city?

MR. MANDY: I will be real brief. It is getting close to lunch time.

JOE MANDY
CITY OF PENSACOLA
FLORIDA

MR. MANDY: My name is Joe Mandy and I represent the city.

I would like to offer this report, which closely concurs to the remarks that Mr. Linne gave yesterday, and for that reason I would prefer not to read it. It more or less would be redundant.

And I also would like to offer you people at this time the opportunity to ask me any questions you may wish about the Northeast area treatment plant.

And that is all I have to say.

MR. WHITE: Well, I guess we will need a little time to glance over this just a second.

MR. MANDY: All right.

MR. TRAINA: Let me just review this thing. The city has decided to put in chemical treatment to reduce the levels down to what the conference recommended with regard to nitrogen and phosphorus?

MR. MANDY: Yes. What our ultimate plan--

MR. TRAINA: On an interim basis?

MR. MANDY: That is right.

MR. TRAINA: O. K.

MR. MANDY: We are waiting for the expansion of the Main Street plant and when that is completed we will discharge the effluent or the influent that is going into the Northeast plant to the Main Street plant.

MR. TRAINA: When will your equipment be in and actually in operation for this interim advance waste treatment facility? When will you be in operation?

MR. MANDY: The Main Street? At this time I really can't tell you. I have just received a report from our consultants on the cost estimates, a rough order, for the purpose of going for State and Federal funds, so, gee, I wouldn't want to really say exactly.

MR. TRAINA: I am talking now about the interim plant.

MR. MANDY: Oh.

MR. TRAINA: That is what I am talking about now, to your existing plant.

MR. MANDY: Oh, it is in operation right now for about the last week or so, about the last two weeks. And the laboratory results are not in yet; otherwise I would give them to you.

MR. TRAINA: Do you think that you are meeting the requirements of the conference?

MR. MANDY: Well, visually it looks pretty good. Now, what that is going to show up on I don't know yet. But we are prepared--well, we are feeding alum right now and then if that isn't enough we will follow it with polymers. Also in discussions with Wayne Tisdale and Ralph Baker, we talked about either putting a polishing pond in or a third clarifier, and so in our discussions we decided to wait and see how the flocculation--what the results are, and if it is down low enough I suppose we will go with the clarifier because the pond itself might produce its own nutrients.

MR. WHITE: Are you saying that the only physical--there have been no physical modifications?

MR. MANDY: Yes. O. K., this is one part, chemical feed.

MR. WHITE: Yes.

MR. MANDY: Now, we also installed, and it is not in operation yet, as a matter of fact today I think the electrical work is being performed on it, a device, it is a relatively new thing and it is being installed--oh, three or four other units have been installed similar to it. This device is a package aeration unit. Its function is to put about 18 to 20 ppm of DO into the sewage at the head of the plant, and this, then, of course, will accelerate or allow the--this is a trickling filter plant--to really absorb more and do a better job. Right now, you know, it is about 85 percent BOD reduction.

MR. TRAINA: Mr. Mandy, just curious, the financing of this, was this strictly on the part of the city?

MR. MANDY: Yes. Yes.

MR. TRAINA: You are to be complimented for that.

MR. MANDY: Thank you.

MR. TRAINA: I think that needs to get into the record.

One final question, sir. When you do convert to your

Main Street plant, what kind of plant will that be and what kind of percent reductions are you shooting for?

MR. MANDY: Well, we are shooting for--well, again, now, this report that was just submitted last Thursday--as a matter of fact, the City Council has just received it, I think, Friday and they have not officially acted on it, so perhaps I shouldn't be saying too much now, then. But it would be conventional.

MR. TRAINA: Conventional secondary treatment?

MR. MANDY: Oh, yes.

MR. TRAINA: Ninety percent?

MR. MANDY: Yes, yes.

MR. TRAINA: With discharge to Pensacola Bay?

MR. MANDY: Yes.

MR. TRAINA: Thank you very much.

MR. MANDY: O. K.

MR. WHITE: Mr. Levin.

MR. LEVIN: Mr. Mandy, please understand, and I have said this time and time again until I have probably worn it out, this is a layman's question.

MR. MANDY: O. K.

MR. LEVIN: What method are you going to use to get the waste from the Northeast plant down to the Main Street plant? What is it, just going to be large--

MR. MANDY: It will be pumped, more than likely. I can't see how it could get there by gravity. And the exact location of the pipe, oh, I don't know, more than likely I would think along the L&N railroad tracks.

MR. LEVIN: I am not too concerned about that part.

MR. MANDY: O. K.

MR. LEVIN: The thing I am trying to get to is, I have heard a proposal advanced that it would not be impossible for the industries that we have been concerned with here in some way to utilize transferring of their discharge from the Escambia Bay down to the Main Street plant. Would that be impossible?

MR. MANDY: Oh, gee, I don't want to say anything on that because I am really not--I don't really know what the industries have or-- You mean you are asking can the industries discharge from their location down to the Pensacola Bay?

MR. LEVIN: Well, what I am saying is, to make it run through you all's pipes, and so forth, to get it down to the Main Street plant and perhaps get it out of Escambia Bay like that.

MR. MANDY: Well, maybe I can answer it a little differently. Our pipes extend as far as Ellyson Field. That is as far as we go today. So the distance from Ellyson further north, I don't know the economics that would be involved, if it would pay them, you know, if they could afford it.

MR. LEVIN: But rather it would be an economic question rather than an engineering question, is this--

MR. MANDY: Now, I am not an attorney here, so I don't know how to answer you. But you have two factors, you have money, and the other thing is--

MR. LEVIN: I don't know whether I like that or not. (Laughter.) I think I have been insulted, but I don't have sense enough to figure that out. (Laughter.)

MR. MANDY: I don't know what is in their waste. It might kill our bugs, I don't know. I mean a study of pilot plant would have to be performed to see if it is compatible. It has been done already with Armstrong and Tenneco and--

MR. LEVIN: I was just wondering if their discharge--if the volume of their discharge is so great that that would be almost--

MR. MANDY: Well, the other one, is it--no, no, I mean the one we just had, 42 million gallons a day.

MR. LEVIN: Monsanto?

MR. MANDY: Yes, that is more than the entire Pensacola pumps of potable water, that is on a hot day. (Laughter.)

You know, that is a lot of water.

MR. LEVIN: Thank you.

MR. WHITE: Just one point, Mr. Mandy.

When do you expect that the operation of the revised facility will shake down and you will be able to give us a final report on efficiencies?

MR. MANDY: Oh, I would say six weeks, something like that. Because you know, it takes six days to get your initial BOD's.

MR. WHITE: But we could count on receiving a report from you then? I guess you would report to the State--

MR. MANDY: Yes, yes.

MR. WHITE: --and we would in turn receive it there.

MR. MANDY: Yes.

MR. MAURIELLO: Let me comment on that there. This brings up a question.

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: This is a technical question, it is not a layman's question, even though the boss is here sitting next to me.

MR. LEVIN: Boy, I am getting it from all directions. (Laughter.)

MR. MAURIELLO: Joe, the Northeast plant is right now under a temporary operating permit until May of 1972.

MR. MANDY: Yes.

MR. MAURIELLO: That temporary permit was issued on the basis that the interim treatment would go into operation and would be acceptable and meet the levels.

MR. MANDY: Yes.

MR. MAURIELLO: Also predicated on the fact that the city in conjunction with the city (sic) would adopt and have adopted the five-year master plan and that by May there would be an indication from the city as to an estimated date when the Northeast plant would be phased out and put into the Main Street plant. Do you anticipate that you are going to be able to have a determination as to an estimated date when the Northeast treatment plant will be phased out?

MR. MANDY: O. K., the entire--your several questions all hinge on one thing which I am afraid I really can't answer, but I will tell you what it is. That would be the financing for the Main Street addition. Now, how this would be projected and obtained, this is outside of my area.

MR. MAURIELLO: Does the recent report which has not been accepted by the City Council yet on the expansion of the Main Street plant include the Northeast treatment plant going into it?

MR. MANDY: Yes.

MR. MAURIELLO: So what you are saying is that unless the financing of the Main Street plant comes along, then the Northeast plant may have to stay as an interim plant for several more years?

MR. MANDY: Yes. Well, you know, there wouldn't be any place to put it, put the flows.

MR. WHITE: Any other comments?

Thank you, Mr. Mandy.

For the record, this statement will be accepted and printed in toto.

MR. MANDY: O. K. Thank you.

(The above-mentioned statement follows:

5121

January 21, 1972

REPORT ON NORTHEAST SEWAGE TREATMENT PLANT
CITY OF PENSACOLA, ESCAMBIA COUNTY, FLORIDA

This report compliments previous reports filed by the City of Pensacola with reference to its Northeast Sewage Treatment Plant and offers particular comments on actions proposed in the August 12, 1971, report.

The Five Year Sewer Plan for Metropolitan Pensacola offered two considerations for this plant; these are:

1. To abandon the plant and pump all raw sewage, or, pump partially treated waste from that location.
2. Make modifications to the existing facility to upgrade quality of treatment to accommodate the new standards and deadlines that would permit an orderly approach to the first consideration.

The City indicated in its August 12 submission that it had elected to follow the second alternative and developed an acceptable program that would entail keeping the existing plant in service for an interim number of years by providing advanced treatment. This was proposed in order to meet the December 31, 1972, deadline. Also, it was pointed out that this direction is more feasible at this time because of the inherent problems, difficulties, and long lead time involved with extensive design, funding, construction, and operational check-out that the City does not believe could be met by December 31, 1972, under the first consideration. In keeping with the findings of the Pilot Plant Study, completed by the City's consultants in December 1970, as well as further research and investigations by City personnel since August 12, 1971, the City has pursued a positive course of action as follows:

Step 1

Established an expanded chemical treatment program that includes the use of coagulants to reduce nutrients. Installation of chemical feed equipment was completed 14 January 1972. Since this chemical feed operation is now in its initial stages, adequate dosage or feed parameters have not yet been established but will be accomplished as quickly as possible, depending upon appropriate laboratory analyses. Visual observations indicate optimistic results will be obtained. It is hoped that these results will be confirmed as soon as the laboratory tests and analyses are completed. It can be appreciated that a period of laboratory testing will be necessary to define the exact dosages or parameters for chemical feeds.

Step 2

Installation of mechanical equipment that will accelerate removal of organic carbonaceous materials is underway and is expected to be completed by 1 February 1972. This is a pre-packaged unit, manufactured by Ingersoll-Rand with a rating of 1,500,000 gallons capacity, that will enhance the plant efficiencies by increasing dissolved oxygen.

Step 3

The last report proposed construction of an oxidation pond. Since then, detailed discussion with personnel of the Bureau of Sanitary Engineering has indicated that better final results of the quality of the effluent may be obtained by a third and larger final clarifier rather than an oxidation pond. It is expected that as soon as the laboratory results of Steps 1 and 2 have been appropriately evaluated, a final decision will be made as to whether a clarifier or a pond will be constructed. It is believed that this final decision can be reached by 15 March 1972, thus allowing adequate time for construction of either the pond or the clarifier on or before the December 21, 1972, deadline.

MR. WHITE: Please proceed, Mr. Mauriello.

MR. MAURIELLO: The next one I have down here would be Mr. Lowery, the President of the Bream Fishermen's Association.

CHARLES A. LOWERY, PRESIDENT
BREAM FISHERMEN ASSOCIATION
PENSACOLA, FLORIDA

MR. LOWERY: Mr. Chairman, conferees, ladies and gentlemen.

I am Charles A. Lowery, the President of the Bream Fishermen's Association.

Before I would go into the prepared text that I would hope that, Mr. Chairman, you would allow to become part of this record, I have two other comments that I would like to make that I feel, representing a sportsmen's organization, possibly have been omitted from this conference.

Number one is the concern for the number of menhaden that have been killed in the Escambia Bay. I do want to emphasize the extremely large number of sports fish along with your shellfish that has been killed in the area too. I mean, I know that your concern is primarily right now possibly with the menhaden, but there has been a significant number of sports fishes that have been killed.

MR. WHITE: Let me clarify that. We are aware that we are getting a large number and we are concerned with all of the fish being killed.

MR. LOWERY: All right. I was sure that you were, but just for a matter of the record I wanted to be sure that we did understand this.

Our group has worked extensively in the lower Escambia River basin for the past three years trying to arrive at some conclusions or offer some constructive criticism or constructive attitudes toward alleviating the problem in the Escambia Bay. We also have worked extensively on the 50-odd miles of river that extend up and into Alabama. We are now involved in various projects on the upper portion of the Escambia River that we will hope will offer background data for this conference in the future.

One other point that I would like to make before I enter the prepared text would be the statement that was, I believe, pointed out by Dr. Wurtz here today in the diverting of the White River. As I said, our group is quite familiar with this area, we have conducted a number of activities in this area from water sample, temperature sample, fish kill investigation, and civilian surveillance. I think that possibly we might consider his point, from this point of view, that the diversion of the White River might get involved with diluting the thermal effluent from Gulf Power, so he might have a due consideration there that would need looking into before we would pursue with the diversionary action there on the upper White.

MR. WHITE: Let me put your mind at rest there, too.

MR. LOWERY: All right.

MR. WHITE: I mean we would have to have some pretty thorough--well, we would have to have a thorough understanding of the area before any recommendation--

MR. LOWERY: Yes, sir, O. K.

MR. WHITE: --would be forthcoming.

MR. LOWERY: As a sportsmen's group, I will make one other off the record--I mean off the written report and then I will continue on and try to be as brief as I can.

The only thing that disturbs our group as a group of sportsmen, and has been pointed out in a number of reports that have been presented, was the fact of nature's way of disposing of the fisheries in our bay and in our river as well. We have had the kills in the river also. If that is nature's way of disposing of or maintaining an ecological balance, I would assume that the big freeze that happened in 1943 in Texas was nature's way of removing the cattle that it was necessary to support the farmers of that area. So we don't believe that this is nature's way of stabilizing Escambia Bay. Or you could even relate it to lung cancer as being the way that nature has of disposing of the unwanted and undesirable human participants in this society.

Gentlemen, I would like to enter at this time the written portion of our report.

The members of the Bream Fishermen's Association respectfully submit the following report as a part of the official proceedings of this conference.

Now, Mr. Chairman, this report is in press at this time and we will not have it ready until Thursday morning. If it will be possible to submit this to you, I want to give you only a summary of it today.

MR. WHITE: Now, let me clear something up. How large is the report?

MR. LOWERY: All right. Let me read this in its entirety. Maybe that will explain the full contents of it. It is about 8-1/2 by 11 size pages, about 30 pages, I believe, and there is quite a bit of background data involved here that would be important to the proceedings.

MR. WHITE: I would like to accept this for the official record, but not include it in the reproduced version, because you have it.

MR. LOWERY: However you want to handle it. I just want to make it available to you.

MR. WHITE: And we will make it and keep it in the official record, but it won't be reproduced as a copy in the transcript of these proceedings.

MR. LOWERY: All right. That would be the main thing, that you do have it.

The title of this report would be Results of a Creel Census of the Lower Escambia River Sports Fishery. This report summarizes the results of a comprehensive creel survey conducted in the spring of 1970 by the Bream Fishermen's Association on behalf of Dr. Thomas S. Hopkins, Department of Biology, University of West Florida. The study area involved the tidewater sections of the Escambia River Basin extending from the mouth of the Escambia River northward to the township of Molino, Florida. The data presented in this report supports the contention of local fishermen that at the time of the creel census pollution had adversely affected the Escambia River freshwater sports fishery.

However, our main purpose in entering this report into the proceedings of this conference is to establish a baseline reference on the status of this fishery that may be used for the evaluation of the results of future creel studies that may be conducted in the same region. In effect, we hope that this data would initiate other research concerned with establishing the present status of our endangered environment. There have been many comments made, as you know, if we only knew what was there before, that we would have some background in order to establish what our fact might be.

I would like to read to you the summary, it will only take about five minutes to do this, maybe less,and give you a summary of the results of the Creel Census of the Lower Escambia River Sports Fishery.

As a result of the excellent support given to the study by local sports fishermen, it became possible to conduct a comprehensive creel census for the Lower Escambia River sports fishery and thus determine its yield status. The census was implemented in the spring of 1970 and covered the months of April, May and June. The selection of the spring spawning season for the census was deliberate in that the best fishing conditions arise at this time of year and fishermen actively participate.

The census resulted in the collection of creel data for 1,234 different fishing trips involving 2,558 fishermen. These fishermen expended a total fishing effort of 14,231 manhours to produce a creel of 13,210 fish.

The overall yield for the Escambia River sports fishery was found to be approximately 0.6 fish per manhour of fishing effort. This minimum figure was bounded by a 75 percent quartile of 1.3 fish per manhour and a 25 percent quartile of 0.3 fish per manhour. The yield data also indicated that the least successful 50 percent of the fishermen caught only 12 percent of the total creel of 13,210 fish. Importantly, over 11 percent of the fishing parties did not catch any fish whatsoever.

As a result of weigh-in data collected from a 9 percent sample of the creel, it was estimated that the total weight of the entire creel produced during the census period was only 2,744 pounds. This data was used to arrive at a mean weight for the individual fish that was estimated to be 0.23 pounds or 3.32 ounces. Using this mean as a weight reference, the weight yield of the Escambia River sports fishery was calculated to be 0.14 pounds of fish per manhour of fishing effort.

Using this yield data, the mean estimated fish weight data and the median trip length data in combination results in the following description of a typical Escambia River fishing party during the creel census period. The average fishing party consisted of two sportsmen who spent a total of 5.2 hours fishing on the Escambia River. Since the yield was 0.60 fish per manhour, each of these sports fishermen would have a total catch of three fish. Using this estimated weight of 0.23 pounds per fish as a reference, it could be expected that the total weight of these three fish would on the average, three fish, not exceed 0.7 pounds. In local fishermen's words, this catch does not describe a mess of fish.

In conclusion, it is felt that this survey fully accomplished its objectives relative to establishing a baseline reference for evaluating any changes in the yield of the Escambia River sports fishery that may be detected by future creel census program. Furthermore, in the opinion of the authors, the creel data properly document the contention of local fishermen that pollution has indeed adversely affected the tidewater sections of the Escambia River sports fishery.

Thank you, sir.

MR. WHITE: Thank you, Mr. Lowery.

Any comments or questions?

Thanks again for your presentation, Mr. Lowery.

MR. MAURIELLO: Mr. Chairman, Mr. White, we have asked Commander Hunsley, who is the representative of the Woodland Civic Association, to make a brief presentation on a project that I think has a relationship to what we may want to consider in the way of a plan of restoration for Escambia Bay. There is a small project that is being considered for the Woodland area, which is right out the window here, practically. It is a bayou that has had an effect very similar to the entire Escambia Bay, and I think it would be pertinent to have this presentation by Commander Hunsley so that you can get a feel for what can be done and some of the R and D work that may be required--that could be extrapolated to the entire Escambia area.

MR. WHITE: I think it would be appropriate to hear this.

MR. MAURIELLO: Commander Hunsley.

MR. WHITE: We have got to make a tough decision on Mulat-Mulatto Bayou.

COMMANDER L. A. HUNSLEY
PRESIDENT, WOODLAND LAKE
PROPERTY OWNERS IMPROVEMENT ASSOCIATION
GULF BREEZE, FLORIDA

MR. HUNSLEY: I will make every attempt I can to keep the presentation very brief.

I would like to say that we are working very closely with various Federal and State agencies. Specifically we have had invited representation from the EPA, the pollution control people, the Corps of Engineers, the city of Gulf Breeze, and members of our own organization in attempting to outline a program that would be definitive and would be of considerable value with application to many other areas.

And if I might at this time, as we presently identify the program, it is a five-phase program, some of which is not related to Escambia Bay and I will very briefly gloss over those particular points.

As was pointed out by Mr. Mauriello, Woodland Lake is close by. We will have a picture of Woodland Lake very shortly here so that you can use it as a reference. It is not only not far divorced from this conference physically, I think it is not far divorced from this conference as far as application to restoration of Escambia Bay.

MR. WHITE: Fine. Before you get going, just so we can keep the record straight on this, we will use these just as visual aids and will not include them in the record.

MR. HUNSLEY: Yes, sir.

...Slide presentation...

MR. HUNSLEY: Phase one of the project--this is a picture of Woodland Lake. For orientation purposes, Mrs. Guice, can you kick back one or kick forward one for orientation purposes?

The Holiday Inn is in the background and this is the mouth of the lake as you saw. So you can see it is a close-by situation.

Phase One, as we presently see it and as we have presently identified it with input from the various agencies involved, would be to document the existing conditions within the bayou. Several conditions exist in there that require documentation and rectification. One is we apparently have a septic tank seepage into the bayou. We have had coliform counts in excess of 2,400 documented by the Public Health Service on several occasions. We are basically sitting on a bowl. We interchange the top layer of water only due to restrictions at the mouth of the bayou. We have a certain runoff contribution. We have a very restricted flow pattern within the bayou and it is clasically a degraded bayou.

This is the channel that we presently have. The natural channel,which I will discuss very briefly,is where Mrs. Guice is pointing now.

But there will be very extensive documentation under the direction of the University of West Florida, Dr. Collard, as presently seen, to establish the conditions as they now exist.

Phase Two, and again I am very briefly touching on these, would be to provide a deep water interchange within the bayou with those waters of Pensacola Bay, and it is our endeavor at the present time to reopen the natural channel which was abandoned by the developer with an alternate channel provided. This alternate channel is a dead loss. We recognize it as such. We are presently in litigation to regain ownership of not only the small part of land, parcel of land between the two channels indicated, but the State of Florida has also entered our suit as a party to our suit and is attempting to regain ownership of the site of the natural channel. In effect, we will return the bayou to as close to its natural configuration as is possibly feasible. And this is basically Phase Two.

Our legal litigation we expect to be resolved very shortly and we have had considerable litigation on this.

It has been going for six months. In fact, I am a recipient of a $50,000 lawsuit because of it, but that is another story.

At the time this bayou is reopened to the bay in a proper format, it is intended to demonstrate the use of an air curtain as a fish control device under very closely controlled conditions.

Phase Three is a proposed removal of the benthic sediments within the bayou. And here we have the application to Escambia Bay as we see it at this time. We are working very closely with the Corps of Engineers. We expect that their experimental people from Vicksburg will be on scene the latter part of this week.

One of the demonstrations that has been asked for in this requested demonstration grant is the use of the mudcat system. Some of you may or may not be familiar with it. It is basically a subsidiary of the National Car Rental Service. It is fundamentally a giant vacuum cleaner and it is specifically designed to remove mud. They have done considerable work with the Corps of Engineers for the Everglades National Park, Disneyland, and so forth. They are fully documented. They are a very impressive group of individuals. They were here last week.

We would like to determine the desirability and feasibility of removing the benthic sediments from the bayou and to document the benefits to water quality and to the biological quality of the waters within the bayou by actually physically removing the benthic sediments. Attendant to that we would evaluate the use of a diaper, which is nothing more than a large polyethylene sheet, as you may, used by the Corps of Engineers. They would like to demonstrate it within the bayou. It would isolate turbidity attendant to the actual removing of these sediments.

There are several methods of processing to remove sediments, one being the conventional settling basins. We are working with the city. The city lands will be made available for settling basins for this material. So we have a conventional method that we would propose to use here.

However, the Corps of Engineers is most interested, and there is much interest from other agencies also, in the development of a system for removal of benthic sediments that would have application to confined heavily populated areas, and in this particular realm the Corps of Engineers is most anxious to demonstrate the feasibility of utilizing centrifuge removal of possible--I am looking for a word. I got my nose fixed and now my mouth broke. Well, the third system while I am thinking of the second system.

The third system is a use of bags, which sounds a little wild. However, it has been used. They would like a demonstration of the bagging system. It has application to confined areas such as Fort Lauderdale in the canals down there, Miami, Bayou Texar, perhaps, here in Pensacola.

But basically it is part of the mudcat system. It is nothing more than a giant vacuum cleaner bag. It is 1 yard in diameter, 15 yards in length, and the sediments go in and theoretically the water comes out and when you fill the bag it is towed away for disposal elsewhere. Perhaps it can be filled on land and the bag broken open at a later date and the sediments used therefrom.

They would like to demonstrate the use of flocculants, polymers, as you may, for settling agents in the settling basins. They would like to proof the possibility of processing through incineration. This is another concept, actually steam the water content of these benthic sediments and leave the sediments themselves.

We would like to demonstrate the commercial and domestic values of the dredge sediments for recycling and reuse. We presently have current experimentation under way by Dr. Bennett to determine the application of these sediments as a top dressing. We would propose to use these sediments ,if they so prove out, as top dressings on our school yards in Gulf

Breeze, perhaps, the City Hall, the city parks, things of this nature. It would appear at this time that a 3- or 4-inch layer disced into a sandy area develops quite a lot and we have some application of this material on a nonscientific basis. It would appear to be very usable and perhaps be very valuable.

We would like to determine the possibility of a commercial venture whereby the costs of dredging such materials could in part, at least, be recouped by use of these sediments on lawns. This is done in the Netherlands all the time. They dredge up these sediments from the various estuaries, from your various canals, and they use them. And perhaps this is something that we should do. We would like to prove this concept in Gulf Breeze.

We would like to determine the buildup of contaminants or toxic substances during the dredging work. We really don't know what we are going to get into on this, apparently. It is an unknown entity. We might have dinosaurs come up from the bottom if we remove the benthic sediments. Nobody is sure this won't happen. But we are certainly willing to take the chance as a group of citizens.

Phase Four. We have petitioned the city of Gulf Breeze to make a study, which they are presently doing, to provide sewage services versus the septic tank services that are presently existing around the bayou and are apparently contributory to high coliform counts. We don't know this yet, but we will document whether they are or are not contributory during the Phase One of the project.

Phase Five would be an approximately two-year afterstudy to determine the long-range effects of the three active demonstrative phases of the project. We are processing the grant application at the present time. It is hoped that the city of Gulf Breeze will be the grant director. We would propose that the project director would be the University of West Florida and the financial officer would be the city of Gulf Breeze.

I think in summary, we who live on this bayou, I have 26 years in the Navy invested in it, we have our own selfish interests in it, of course, but beyond our own selfish interests in improving the bayou we feel that we can make a very fine contribution to knowledge that could have, perhaps, application to many larger areas of water. We are small enough to make an economically feasible and manageable project. We would have the utmost cooperation of the people within the bayou. Yet we are large enough to make a meaningful project and get meaningful data from it.

And we would appreciate the opportunity to participate in such a project if it is so approved.

MR. WHITE: Thank you, Commander.

Any comments or questions?

Mr. Levin?

MR. LEVIN: These people that have this giant vacuum cleaner, so to speak.

MR. HUNSLEY: Yes, sir.

MR. LEVIN: That is the way you described it, I believe?

MR. HUNSLEY: Yes, sir.

MR. LEVIN: Did they by any chance take a look at the bay and see whether or not that body of water is too large to consider such a thing?

MR. HUNSLEY: They have surveyed the bay and they feel that the mudcat concept has application to the bay. This is a large organization. They have, I think, over 250 small dredges on the shelf at the present time. They have done a lot of work. It is a new concept,but they have not done too much work yet for the EPA or agencies such as State agencies.

They do feel that they could work the bay, yes, sir, at a dollar a cubic yard in here.

MR. WHITE: Any other questions or comments?

MR. LEVIN: Roughly how much money is that? How many cubic yards have we got?

MR. HUNSLEY: We have 65,000 cubic yards of tapioca, I describe it as tapioca as consistency, within the bayou, and there are parallels to our benthic sediments and those in Escambia Bay. They are not exactly alike, I understand, but there are parallels.

MR. LEVIN: When those folks get back down this way, would you ask them to get in touch with me?

MR. HUNSLEY: Yes, sir. I have some of their presentation material, too, if you would like to take a look at it, Mr. Levin.

MR. LEVIN: Thank you, sir.

MR. HUNSLEY: They have a very good presentation. I wish they were here today, seriously, because we were very impressed with it, and if I could have stolen their suitcase it would be here today.

Thank you.

MR. WHITE: Thank you, Commander.

MR. MAURIELLO: I would like to make just one brief comment, Mr. White.

I think that from the Department's standpoint we feel that this project does have application here in Escambia County, but we also see possibilities of any results that come out of this on a Statewide basis and that there are other areas, possibly, it could be applicable to. And whatever consideration EPA could make in regards to the R and D project, I think we would all benefit by it.

I have one other, Mrs. Guice and a Mr. Boylston. Is there a possibility that these can be combined? They are both from the Salt Water Sports Fishermen's Association. Would you make one statement?

MRS. GUICE: I think that is my child.

MR. WHITE: Would you come forward, Mrs. Guice, please.

MRS. GUICE: I think that is my child, John Guice, and also his friend who were going to speak today, but they had to go back to school, couldn't wait. But I am Mrs. Guice and I have some slides I would like to show you.

MR. WHITE: Fine. Are these slides relating to Escambia Bay?

MRS. GUICE: Yes, sir.

MR. WHITE: Color photographs?

MRS. GUICE: Yes, sir.

MR. WHITE: The reason I--

MRS. GUICE: Yes, sir.

MR. WHITE: Well--

MRS. GUICE: I think you should see them.

MR. WHITE: I am not--I am just concerned with logistics. I am getting printed material and I would like to clarify it.

MRS. GUICE: I will give you black and white of them.

MR. WHITE: Fine. After we see them we will decide whether or not they will be printed in black and white in the transcript or just kept in the one official record without reproduction.

MRS. GUICE: O. K.

MR. WHITE: But I will clarify that as you go on.

MRS. J. J. GUICE

UNITED CITIZENS AGAINST POLLUTION

GULF BREEZE, FLORIDA

MRS. GUICE: I have got to have somebody operate this while I go to the lectern.

MR. SARGENT: I will do it.

...Slide presentation...

MRS. GUICE: All your speakers have told you like it is. Now I want to show you like it is to a voting citizen.

This will identify the area where I am flying. My husband happens to be the pilot. He asked me to go up one day and I had the camera in the plane, so I started taking photographs.

The next one, please.

This is over American Cyanamid and this shows their dumping area, which I believe has a leaching ability to the bay.

The next one, please.

This is the two holding ponds and I found something here with my binoculars. I found some type of hose going out of this, some type of pipe out into the outside area. It hasn't been explained to me yet and I would like to know what is going on there. I feel like that when we have a heavy rain there is an overflow that goes out into the woods and the surrounding area. I have black and whites of this, if you would like it.

MR. WHITE: Color is fine if you just proceed.

MRS. GUICE: O. K.

The second one, please.

This is a real bad eroded area where some of these pipes seem to go out and flood at times. It is near the holding pond, American Cyanamid.

Go ahead, please.

This is another one of their dumping areas. It appears from the air that this has containers there that are partly filled with chemicals that just splash out on the ground and go wherever the rain carries it.

Proceed, please.

And you can see this is horrible looking.

Next one, please.

This is Judges Bayou, which is right nearby. You can see the holding ponds in the background. And I have seen this bayou when there were six feet of dead fish, mostly menhaden, in it. I have seen that bayou when you couldn't even get through there in a boat, all you could see was dead fish.

This is Escambia Chemical. Flying on up the bay we saw something we didn't like. The water looked like chocolate syrup and it was coming out of Escambia Chemical. This was September 10, 1971.

Proceed, please.

It was going out into the bay approximately one to two or three hundred feet out into the bay. It was definitely coming out of their outfall. We went back a couple of times and checked it thoroughly and there were three people looking down on this. I went home and called every agency I could think of and could get no one, so I went up the bay myself to get a sample and later I called Mr. Doherty and he went up the following Friday and verified the fact that it did look like this.

The wind was coming out of the southeast blowing toward the northeast and it appeared that this was carrying the flow of this material in around Floridatown, in around the beaches, and it was just terrible looking, really.

That is the pier up at Floridatown.

Proceed, please.

That is the most horrible looking thing I have ever seen any place in the water.

MR. WHITE: What is that, Mrs. Guice?

MRS. GUICE: I don't know what it is; I would like to know. It is coming from--

MR. WHITE: What area also?

MRS. GUICE: This is a peninsula that sticks out in the water just past--well, it is Floridatown. I can take you there in a boat or by land. But this material was coming from Escambia Chemical, Air Products Corporation.

And this is our God given rivers and our God given grasslands and our swamp area, which a lot of our scientists would like for us to believe--our imported scientists, pardon me, would like for us to believe this is what is causing pollution in the bay. I very much disagree with them.

MR. RAVAN: All these photos on the same day?

MRS. GUICE: Yes, sir.

Going on up toward Gulf Power we saw this filtration or siltation of the water of mud and salt and chemicals and we didn't like the looks of this, so we went and tried to find out where this was coming from. This was the mouth of Thompson's Bayou.

Next one.

We saw that this was coming on to some kind of a retainer wall where Gulf Power has a canal there where they dump into, so we went further trying to find out the location of this muck or mud or whatever it be.

This is their holding pond where they do their scrapings and put it out into this water and it eventually gets into our river, I am sure of that.

Proceed, please.

This is where they pollute the air with their smokestack and that is their coal dump. As you can see, the water is very dirty there. There are many areas like this around Gulf Power and we found after a flooding rain the night before most of this mud was coming from this area.

You can see that that big clay area is in the right-hand corner, lower corner. It was on Gulf Power's property.

And this is our dear friend, Monsanto.

Proceed, please.

This is some of the pollution they put in the air. Now, I did take this one two or three days later from the ground. In fact, you can see my steering wheel in the front of this picture.

I found many dumping areas there that I didn't like the looks of. I think they should clean their face.

Proceed, please.

And I have been told that this is their holding pond for the material that they pump underneath the ground. I don't know whether this is true or not, but I have been told that this is what this is and it is terrible looking material, whatever it be.

This was out in front of their plant and I was told by one of their officials that this was some of their salvage material, their scrap material, that they just dump it out in the open like this.

And this is a stream, believe it or not, and I have been told by one of their officials publicly at one of our hearings that they were dumping scrap material in this stream and I was also told that this is where their first source of polychlorinated biphenyls was put into.

Another dumping area. And if they have all this acreage out there with this natural seepage, why would they leave these open places like this for the rainfall to go ahead and do whatever it does, drain into these other areas?

See the green water down in the lower corner? This is still Monsanto.

And this is where their barges load on. And by the way, I had two cameras in the car and I see that my Instamatic is much better without a telescopic lens than the other camera was with a telescopic. This is done with the telescopic lens and it is not near as good as the Instamatic without it.

This is a little grand canyon up at Cottage Hill. I think this little canyon here when we have rainfall puts soil into the river and it goes from the river to the bay and I think this is one of our problems. I think things like this we should look around the countryside and stop this, even up into Alabama.

MR. WHITE: Could you tell me where Cottage Hill is?

MRS. GUICE: It is in Florida, sir. It is up near Cantonment.

MR. WHITE: Up near Cantonment?

MRS. GUICE: Yes, sir.

MR. WHITE: O. K.

MRS. GUICE: Now, we have--this is the peninsula we are on now. We have a terrible, terrible erosion problem.

From the grand jury hearing we had last year the State Attorney ordered the State of Florida to establish bulkheads all the way around the coastline, and they have not made any attempt to do this and we need it. As you see there, we are losing many things, trees, soil and several other things. And our property is going down in value.

We also have a litter problem. Most of us in Pensacola and in the area are very proud of our bridge out here. That is a poor picture there because I can get it where there are truckloads of it. I just happened to have my camera when I had a little bit there.

But people that go out on that fishing pier on the bridge just dump and dump and dump, and every Saturday you can go out here and take up boatloads of it, really, or truckloads of it, and most of it is coming in on Gulf Breeze. I want to know who is going to clean it up and who is going to pay the bill.

Now, this is after a menhaden kill in the month of November and the water looked like soup.

MR. WHITE: Where was this picture taken?

MRS. GUICE: This was taken in the bay.

MR. WHITE: In--

MRS. GUICE: Yes, sir.

MR. WHITE: In Escambia Bay?

MRS. GUICE: Yes, sir.

That was taken in a friend's yard right near by.

This was in the bay also.

Proceed, please.

Now, I want to tell you men something. This hasn't been brought out. I think Mr. Lowery mentioned this. But we are losing many more fish other than menhaden, although menhaden is the second most valuable fish, commercialwise, in the State of Florida because of the fact it goes into fertilizer and bait and also in the food chain, it is very valuable in the food chain. But we are losing edible fish, we are losing sport fish, and I find fish constantly around on both shores of the Sound. Now, these were taken on the south side of the Sound.

This fish here was about 36 inches long and I should have got a closeup because he looked terrible, really. There were no markings of anything like a hook or a gig or anything like this on him. I checked him thoroughly. All I could find was spots on his mouth that were red and his gills were all red and his body in spots were red.

Same thing.

Even the jellyfish are dying. Something is terribly wrong with the Sound this year.

Mrs. J. J. Guice

Now, this is where our Sound and our gulf meet.

Go ahead, please.

Even last year after all the tons and tons and tons of sand that was pumped out of the mouth of that place trying to flush it out. I don't know where you are going to flush it to because look what you are doing to the Gulf. The Gulf is turning green with overenrichment.

Our fishing fleet lies in harbor, our fishermen are out of work, most of them have left the State. They are waiting, just like us housewives are waiting.

Now, I used this sign last year when a bunch of our housewives marched on the county commissioners, and I say that county, State and Federal politics are the result of our bay being in the condition it is in. I think they are tied hand in hand, is what I am trying to say. Not the local, not today's politics, the people sitting here, not these people, at least not all of them. (Laughter.) I am being truthful.

All right, go back to your Health Department. Who was in charge when it happened, when it started? Go back and think. But there is a few people in politics, Federalwise and Statewise and local, that should be kicked out of the State of Florida if there is any other State that will take them. (Laughter.)

MR. WHITE: Mrs. Guice, I would like to thank you. This is an excellent group of pictures you have there.

MR. LEVIN: I wish she had waited until after lunch. (Laughter.)

MR. WHITE: And I would also like to ask you this.

Would you make prints available to us and would it be too much trouble for you to label what they depict?

MRS. GUICE: I will.

MR. WHITE: And we will again keep this as a part of the official record, but won't attempt to reproduce it in our transcript, although I would love to be able to and do it in color because the pictures are that good.

MRS. GUICE: You might not want what I said at the last there, would you? (Laughter.)

(The above-mentioned Exhibit, Exhibit 1, is on file at the office of the Environmental Protection Agency, Region IV, Atlanta, Georgia.)

MR. WHITE: Are there any other comments or questions by the conferees?

Thank you very much, Mrs. Guice.

Mr. Mauriello.

MR. MAURIELLO: That is all there is.

MR. WHITE: Let's go off the record a minute.

(Off the record.)

MR. WHITE: Let's go back on the record.

Let's take a very short five-minute recess now and then we will proceed with the State of Alabama's presentation and try to go to a conclusion. Hopefully we will be through, say, by 1 or 1:30.

We stand recessed for five minutes.

(RECESS)

MR. WHITE: Let's go back in session, please.

We will now proceed with the State of Alabama's presentation.

Mr. Crockett.

MR. CROCKETT: I would like to ask Mr. John M. Bolton, Assistant Director of the Technical Staff of the Alabama Water Improvement Commission, to present a statement on behalf of the Commission.

MR. WHITE: Before proceeding, we will indicate that Mr. Ravan is now back with us on the panel.

(Mr. Ravan returned to the conference at 11:30 o'clock.)

JOHN M. BOLTON, ASSISTANT DIRECTOR TECHNICAL STAFF, ALABAMA WATER IMPROVEMENT COMMISSION, MONTGOMERY, ALABAMA

MR. BOLTON: Mr. Chairman, conferees, ladies and gentlemen.

My name is John M. Bolton. I am a member of the staff of the Alabama Water Improvement Commission.

We have been meeting down here in Pensacola as far back as 1961 regarding this problem and during each one of these sessions we have heard various people representing industrial groups and others say I am not the guilty one, it is somebody else. On many occasions they pointed the finger toward Alabama. Today we even heard that it is not an industrial source or not an industrial problem that is creating this situation, it is a natural situation.

I would like to refer you to the Environmental Protection Agency's report that was given earlier this week where the TOC values above the city of Brewton were 4.0 ppm, 4.0 mg/l, whereas the average TOC values at Century, just in Florida, were 6.0 ppm. I submit to you that is a relatively insignificant increase coming from the State of Alabama.

I would agree in part that some of our problems are in fact due to natural forces. And for those of you that are not familiar with the Conecuh-Escambia River, who have not ridden the river from Brewton to Pensacola, I would like to point out that this river is in fact two different streams. In Alabama, for instance, it is a swift, shallow, fast-moving stream. Just below Century this stream deepens, it is affected by tidal influences and it is quite sluggish. It drains large swamp areas.

During 1956, prior to the construction of the Container Corporation's plant at Brewton, Mr. Crockett referred to a report in which we had the occasion to run studies from Brewton down to Pensacola. During that period we ran some tests that during a period of a major hurricane, how our people got out in that weather I don't know, but during that period when the river flows up around 20,000 second feet, the oxygen consuming values BOD_5 were up around 2.5; the DO values, dissolved oxygen values, were depressed; there were also depressed pH values, indicating the presence of the swampy waters that were drained out of these swampy areas I am speaking of. I mention this merely for background.

And Mr. Levin, in consideration of your request made earlier at the conference that you wouldn't like to hear things that have been said before, the remaining part of our statement will be quite brief and we will not try to repeat material that has been said before on the part of the State of Alabama.

My statement in behalf of the Commission will be brief insomuch as only two sources of pollution in Alabama have been identified as contributing to the problem of the interstate waters of Escambia Bay and Escambia River.

One source involves the discharge of untreated sewage from the community of East Brewton. The town has a population of 2,336, of which approximately 1,800 people or 78 percent are now served by sewers. One of the recommendations adopted by the conferees following the second session of this conference in Pensacola on February 23 and 24 was that the city of East Brewton install secondary waste treatment facilities acceptable to the Alabama Water Improvement Commission by the end of this year, December 31, 1972. I am pleased to report to you, as you have heard earlier, that based on actions taken thus far, it appears that this date will be met. We have previously asked that Mr. Weaver, who is the Mayor of the city of East Brewton, appear out of turn in order that he might go back to his work. We certainly appreciate this action on the part of the Chair.

The second source of pollution originating in Alabama which has been identified during previous sessions of this conference as being associated with the problem and again under consideration today is that of the discharge of treated wastes from the Container Corporation of America's pulp and paper mill located near Brewton.

During this conference we have heard a report presented by a representative of the Environmental Protection Agency describing their findings following an evaluation of expanded wastewater treatment facilities at this plant. This was an extended study, one that lasted for some two weeks. The report rendered by the EPA representative also contains data accumulated at the time of the study period, namely June and July 1971, of the Conecuh River and tributary streams in Alabama to the main stem.

Prior to the conference a draft copy of the report was made available to the Commission's staff, and it was made available, I might say, in sufficient time so that we could give a complete review to that report. It was heartening to learn that the EPA report revealed a percentage reduction of carbonaceous wastes, as recommended by the previous conference, in excess of 90 percent. More importantly, as the result of in-plant process changes, the quantity of carbonaceous wastes generated daily has been reduced and as a result the total number of pounds of BOD or carbonaceous materials discharged per day after treatment is substantially less than the amount originally specified by the conferees. As a matter of fact, the conferees specified that the limit be restricted to 4,850 pounds. I believe that the EPA study revealed that only 2,220 pounds per day were discharged during their study period. Additions and improvements required to bring about these reductions were completed and placed into operation 18 months earlier than the December 1972 date specified by the conferees.

We are of the opinion that the EPA report covering its evaluation of the Container Corporation's pollution control facilities accurately reflects the performance of the facilities at the time of the study and wish to commend those responsible for its planning and execution. It should be recognized, however, that a major portion of the treatment units rely on biological processes and since the study was performed during the relatively warm month of June, some decrease in treatment efficiency may be expected during cooler months.

The EPA study represents an excellent example of a cooperative effort between State, Federal and industrial interests all working toward the same goal. We are pleased to have participated in some degree in this understanding. The results of the study should serve as a valuable source of information, not only to this conference but for use throughout the southeast where similar type mills are located and comparable treatment systems employed. Some of the parameters or tests used in the evaluation study have not been widely used in the past and consequently a complete understanding of their significance, the capabilities and limitations of treatment units presently employed and the effect of contaminants as measured by these tests is needed. And gentlemen, I refer, of course, to some of the previous items we have discussed, the TOC determination and the COD tests which have not been used in the past. This can, of course, come about, this understanding, only by the duplication of similar studies on other mills and receiving streams. The staff of the Water Improvement Commission looks forward to a full discussion of technical aspects of the report with EPA and Florida officials at the proper time.

On January 20 this agency received a copy--this was last Thursday--of a report comparing the Escambia River water quality with other streams in the northwest Florida area. The letter transmitting the report requested our review with comments as soon as possible. The letter further stated that the report would be presented at this conference. Needless to say, we have not had an opportunity to review the report and would, therefore, request that the record be held open 30 days to permit the incorporation of our comments should they be needed.

MR. WHITE: We will be happy to hold the record open for that, Mr. Bolton.

MR. BOLTON: I don't think, Mr. White, that there will be too many comments that we would have, but I do think that we should be given an opportunity to respond, certainly more time than what was permitted, and we recognize the press of time that was involved in the preparation of that report.

We have been requested by the Container Corporation-- I believe that this is the only representative of Alabama that wishes to be heard--that they be given an opportunity to present a statement here today. I shall call on Mr. David Lang, Plant Manager of the Brewton Mill, at this time to give a statement.

MR. TRAINA: Can we get some comments, Mr. Bolton, before we get to that?

MR. BOLTON: Surely.

MR. WHITE: Go ahead.

MR. TRAINA: The Federal report, John, that you referred to suggests that additional reductions at Container could be made by providing additional treatments of bleach plant and woodyard wastes and eliminating short-circuiting in the aeration basin and oxidation pond. Is the Commission going to follow through with those suggestions as orders or recommendations to the plant?

MR. BOLTON: We haven't given complete study to this recommendation, but we very definitely have some ideas as to how the short-circuiting can be prevented. We have not discussed the report at all with the Container people.

I say we received it in ample time. During the last conference I think we received a copy of the report about two days before the conference. We did get this one a couple or three weeks.

MR. TRAINA: I take it since you have had this time to review it--

MR. BOLTON: We have.

MR. TRAINA: --that you do agree--

MR. BOLTON: We certainly have.

MR. TRAINA: --with the suggestions here?

MR. BOLTON: We very definitely agree with the observations and with the findings that short-circuiting is occurring and we have some ideas, such as the moving or shifting of aerators in the aeration basin and possibly reversing the rotation of the aerators so that we can induce motion countercurrent to what is being observed now. If you will look at your sketch there that depicts this phenomena, you will see that the wastes come in and actually hang to one side, all of the aerators are turning in the same direction, so they tend to throw this waste in one direction. We feel like, and we have actually requested this of another mill in Alabama, where the alternate aerators operate countercurrently in direction or rotation.

MR. TRAINA: What about the other suggestion regarding additional treatment to the bleach plant and woodyard wastes?

MR. BOLTON: I think this would be a matter that would be taken up with the conferees during the executive session. The bleach plant itself is receiving secondary treatment in their natural pond system. We shall be happy to discuss this with you if indeed this might be included. There are some problems which I am not familiar with involved in the treatment of bleachery wastes in the system that they have now.

MR. TRAINA: At this point the State is not going to take any actions on this particular--

MR. BOLTON: No, sir, I did not say that.

MR. TRAINA: O. K.

MR. BOLTON: I mean we are at the point where we must decide whether we are going to take action or not--

MR. TRAINA: O. K.

MR. BOLTON: --right here today, as I see it.

MR. TRAINA: I guess I meant unilateral action without--

MR. CROCKETT: May I make--

MR. WHITE: Mr. Crockett.

MR. CROCKETT: Let me comment on that point, that certainly not to the extent that no action will be taken, that there is treatment provided for both the woodyard wastes and the bleaching wastes. In view of the accomplishments at Container in reducing this waste load and the difficulties in treating these named wastes, woodyard wastes and bleaching wastes, we feel that there should be some discussions made on that particular requirement.

MR. BOLTON: Mr. Crockett, let me amplify or go further.

I think very definitely, Mr. Traina, that we will take action in connection with the reduction of wastes generated or resulting from the discharge of wastewaters from the woodyard. We can say that off the top of our head. There are some technical considerations that I am not well versed enough on to say what we would require or to what extent we would require further treatment on the bleach plant wastes alone.

MR. TRAINA: Maybe the company could speak to some of those.

MR. BOLTON: Perhaps they can.

MR. TRAINA: Thank you.

MR. WHITE: Any other comments or questions?

Mr. Levin.

MR. LEVIN: I just want to find out. This is my first go-round on this type conference here in Escambia County.

Have you all made any studies further north of Container and East Brewton to determine if there are any other sources other than natural sources that contribute to the problems of the river? In other words, are there any other small cities, for that matter, that are using the Conecuh or any of its tributaries in order to dispose of its wastes and things of this nature? I mean is it logical to say that on all the miles and miles of this river that there are only two sources of pinpointable pollution in the river?

MR. BOLTON: I think that I could say very definitely this first, that this drains a phenomenally rural area of Alabama. The river actually heads up, has its origin around the community of Union Springs, Alabama, which is just east of Montgomery. There are communities located on or nearby the Conecuh River as it traverses down through the State.

My observation in reference to the condition closest to Florida was to the summary that appears in the EPA report which identifies the water quality irregardless of what it might be up there. There are no industrial sources, I can say, upstream. There are some municipalities that use the stream for disposal of their treated wastewaters.

I would refer to the parameters that are listed on Table 5 which identify the nature of the water quality above Brewton.

MR. LEVIN: I know what you are saying is that it doesn't make any difference what goes into it as long as you measure it around Brewton and you have got your water quality there, it doesn't make any difference--

MR. BOLTON: I really don't mean to say it that way, Mr. Levin. This conference has addressed itself in the past and included recommendations directed at two sources that this conference considered affecting in some way the waters that we are concerned with here today.

MR. LEVIN: Well, I know. But you see, I have a problem in my own mind of whether or not there ought not to be other sources that we ought to look at, for two reasons.

One, not being an engineer or biologist, the thought occurred to me that there may be some--I believe you all used the word parameter?

MR. BOLTON: Test.

MR. LEVIN: --test that may not be used that could determine something else that is in that water besides these particular substances that we are apparently all concerned with and that is all these letters that we hear about, BOD's and TOC's and all this sort of thing.

MR. BOLTON: I am going to bring you a sack of TOC's tomorrow before we leave.

MR. LEVIN: No, don't do that. I don't want you to bring them. (Laughter.)

And the second thing is that I wonder if perhaps, like you said, the flow of the river, being as swift as it is, if that would not have some effect on the reliability of the tests so that whenever it gets down to the Florida part where it is affected tidally by tidal action that maybe these things begin to appear for the first time.

MR. BOLTON: I know of no other tests that are used except perhaps toxic metals or something like that, that you would have some justification for including in this table other than I don't believe COD is included in this test. This is a test that does not tell the whole story, has many shortcomings, we have learned.

But I can tell you without reservation that we have no plants that are generating toxic materials in the Conecuh Basin, to my knowledge, no materials of that nature are being discharged, and I know of no other tests that would reveal something, as you mentioned, by the swift nature. It is impounded up near Andalusia, but between Andalusia and Brewton it is this free flowing state and does exist down into the, oh, several miles into Florida before it is affected by the tidal influences and swampy and has a very slow movement.

MR. LEVIN: It may not mean a thing in the world, but I would like to know just for my own satisfaction whether you are aware of any other small or large cities or small or large industries that are using that body of water for discharge of its wastes that in any way could make its way down the Escambia River?

MR. BOLTON: Let me answer in part. I think Mr. Crockett wants to respond too to this.

I am not aware of industries located on the banks of that stream that are discharging at all. There are municipalities that are discharging along its length at various points or into tributaries.

MR. LEVIN: Untreated wastes?

MR. BOLTON: I believe there is one untreated waste that is just south of Montgomery, Brantley, the community of

Brantley.

MR. LEVIN: How many people live in that community?

MR. BOLTON: Very small. That is four or five hundred, I imagine, that are being sewered.

MR. LEVIN: Are they under orders by your department?

MR. BOLTON: They are under orders by our department. They appeared at our October 1, 1971, meeting and had some severe--or had instructions to proceed, yes, sir.

MR. LEVIN: Other than Brantley, now, and East Brewton, to your knowledge there are no other cities, municipalities, communities, industries placing anything else in the tributaries or branches of the Conecuh--

MR. BOLTON: Would you let Mr. Crockett and I kind of refresh ourselves here because we would like to examine--

MR. CROCKETT: Let me.

Mr. Levin, all municipal waste discharges were first documented by our statement to the 1962 conference. It is a matter of record. In 1970 we again documented the sources of wastes, the degree of treatment, and the number of miles that the discharge took place from the State line. It is a matter of record of this conference in which we are in the third session now and as a result of the first statement was when the sources of wastes upstate, so to speak, were deleted from any conference action.

But it is a matter of record in the first session, the 1970 session.

MR. BOLTON: Mr. Crockett, is it not true, to your recollection, that Brantley, which is near the upper reaches of the Conecuh, up just 40, 50, 60 miles south of Montgomery, actually, is the only community on the main stem of the river that has untreated wastes?

MR. CROCKETT: On the main stem of the river, and from Brewton north on the main stem to Andalusia, has secondary treatment, is some 75 miles. There is a community, Greenville, Alabama, it is on a tributary and this is up in the extreme northern section off the basin. If I am not mistaken--

MR. BOLTON: It is not on the main stem.

MR. CROCKETT: It is not on the main stem.

MR. BOLTON: It is some miles removed.

MR. CROCKETT: This community or city was also placed under directive order by the power commission, and if I am not mistaken that we do have final plans for secondary treatment in now.

MR. BOLTON: On Greenville, yes.

MR. CROCKETT: Right. Greenville, of course--there is no city--well, there is no--we don't have any cities in

Alabama within the Conecuh River Basin that I think exceed a population of around 12,000. From a population standpoint that basin has lost their population within the last two decades. But any other information that is not contained and if this information in the 1970 transcript is not accurate and you wish it to be brought up to date, we will be glad to do so, but we did not report on it at this conference because it was not made a part of the conference after the first statement.

MR. LEVIN: The only thing I am trying to find out is whether or not you all are aware of any other sources, whether it is on the main stem or the south--

MR. BOLTON: I appreciate that. Well, Greenville is some distance from the Conecuh River and by the time-- They will be under construction very shortly, will they not, Jim?

MR. LEVIN: Greenville discharges into a tributary?

MR. BOLTON: A tributary located some distance. And when I made my earlier statement about on the main stem, there was only one, which is still some distance upstream and could not--any of their wastes--this is a municipality--any of their wastes would be reflected in the values that I referred to in Phase Five.

MR. LEVIN: Again assuming as far as manmade technology, as far as man knows now, that those parameters are available, that we haven't come up with something else that we ought to be testing that we haven't tested. Do you see what I am concerned about? Just because we have been using these particular standards for all these years doesn't necessarily mean, in my mind, again as a layman, that we are not overlooking something that perhaps ought to be tested if we were at a sufficient stage of technology to where it could be tested.

MR. BOLTON: Let me say this. During the course of the some 11 or 12 years that we have been examining this problem down here there have been at least one, the TOC test, added and we do not yet know just exactly all of the significant factors regarding the meaning of TOC. We feel like that this will be, as I pointed out in my statement here, and it was interesting that some of the Federal people had brought out the same point, we are beginning to gain a background or a technological understanding of the significance of TOC. COD has been used for years, but we have known that it had many shortcomings. It varied from one industry to another. COD couldn't be compared. The BOD determination that has been used, and that the universities used and has been used as a tool when the 1969 conference conclusions were developed and recommendations were developed, represented the best tool that we had then. If we have another one today, if you have one in your little briefcase that you would like to throw out, we would like to hear about it.

MR. LEVIN: I don't even have the old one. (Laughter.)

MR. WHITE: Mr. Crockett.

Mr. Traina?

MR. TRAINA: No.

MR. WHITE: Comments or questions?

Well, then, we will proceed with the next presentation.

MR. BOLTON: Mr. Lang, I believe, will give the Container statement.

DAVID LANG, GENERAL MANAGER
BREWTON, ALABAMA, MILL
CONTAINER CORPORATION OF AMERICA

MR. LANG: Mr. White and conferees, ladies and gentlemen. I am David Lang, General Manager of the Brewton, Alabama, mill of Container Corporation of America.

Again this year, Mr. Chairman, we have divided our statement into two parts. The first is a progress report on our water pollution abatement accomplishments and research activities since this conference was last convened on February

23-24, 1971. Since this report will be of interest to everyone here, I would like to present it orally.

The second section is primarily a compilation of technical reports supporting my verbal statements. Also included are reports on our extensive investigations of procedures that have been suggested for removal of color from our effluent. I would like permission to have this section inserted into the public record without going into details now because of the technical nature of the subject.

MR. WHITE: It will be accepted into the record.

Here, too, let me make another point on this. I believe we will make this an exhibit of the official record and not reproduce the appendix in toto in the transcript of the conference. I am just concerned with keeping the volume down a little on this.

(The above-mentioned Exhibit, marked Exhibit 2, is on file at the office of the Environmental Protection Agency, Region IV, Atlanta, Georgia.)

MR. LANG: At the 1971 session of this conference we described in detail the $750,000 aeration system we placed in operation in October 1970. At that time we did not have performance data to present. We can now report that the addition of the aeration system has increased the reduction in

5-day BOD of our effluent by 9 percent. This improvement in BOD removal has allowed us to achieve a maximum of 91.5 percent BOD reduction during the month of June 1971. It should be pointed out, however, that this high degree of BOD reduction is not achieved during the colder months of the year when lower water temperatures slow down bacterial action.

Between June 21, 1971, and July 2, 1971, EPA research personnel and Container Corporation employees conducted a river and waste treatment survey. The EPA results were presented to this conference earlier. Our own data are submitted in our written statement.

Both studies confirm the improvement in effluent treatment mentioned earlier. The EPA data show even a greater degree of pollution abatement than do our own. This difference however, reflects only the reasonable variation that is expected in scientific studies of this nature.

In August 1971 stream biologists from the Institute of Paper Chemistry in Appleton, Wisconsin, conducted the 15th annual biological water quality survey of the Conecuh-Escambia River between Brewton, Alabama, and Escambia Bay, Florida.

The final report of this study has not been issued. However, a copy of the preliminary letter report is contained in our written testimony. I would like to quote the summary paragraph from that letter:

> In summary, an improvement has been noted in the section of the Conecuh-Escambia River which is influenced by treated paper-making wastes from the cooperator's mill in Brewton, Alabama. An absence of slime growths at Stations 4B (downstream Brewton Lake outfall) and 5 (Pollard) was accompanied by an increase in diversity and density of intolerant macro-benthic organisms to levels similar to Station 1 (Edward's Bridge).

What that all means to those of us who, like myself, are not scientists, is that the effluent from the Brewton mill has been so thoroughly treated that it does not have any measurable effect on the normal living creatures in the river downstream of Pollard, Alabama. Beyond Pollard the quality of the water is essentially the same as it is upstream of the mill.

At the last session of this conference we indicated that we would continue our studies on removal of color from our waste discharge. We have done this, but regretfully must report to you that an industrially feasible method of removing color from our effluent does not exist at this time.

D. Lang

Our technical and research personnel have diligently continued their studies on methods which might be of possible use in removing color from our effluent. As stated earlier, detailed reports of these studies are presented in our written testimony. However, I would like to highlight the investigations which have been made, or are continuing, in our search for a suitable method of color removal, with particular emphasis upon a project we think is most promising. These include:

1) The massive lime treatment pilot plant, operated under an EPA grant by International Paper Company at Springhill, Louisiana, which was studied in operation on August 10, 1971, by our people. The Brewton mill laboratory also carried out additional lime precipitation studies.

2) The alum precipitation pilot plant of Gulf States Paper Company at Tuscaloosa, Alabama, was visited. Alum precipitation studies were also carried out by the Brewton mill laboratory alone or in conjunction with Allied Chemical Corporation and Nalco Chemical Company.

3) The use of Amberlite XAD-8 resin

in ion exchange for removal of color bodies is being evaluated in conjunction with Rohm and Haas Company.

4) The study of activated carbon for color removal was continued by the Brewton mill laboratory.

5) The current state of the art was reviewed for hyperfiltration and reverse osmosis as possible processes for color abatement.

6) The use of ozone, a powerful oxidizing agent, is currently being evaluated in cooperation with Air Reduction Company, Incorporated, and W. R. Grace and Company.

7) The addition of direct oxygen to the bleach plant effluent was evaluated by the Brewton mill laboratory as a potential aid in color reduction.

8) Finally, a little over a year ago, we became aware of introductory research by the Oak Ridge National Laboratory and Owens-Illinois Company on the effect of gamma radiation on kraft mill effluents. Our evaluation of this work led us to believe the process might offer

a most useful method of color abatement. Even further, it might offer a procedure for the degradation of other organic materials which are normally resistant to biological oxidation.

We, therefore, stimulated renewed interest in this concept on the part of the Washington office of EPA and the paper industry. In conjunction with Owens-Illinois Company, we have outlined a feasibility study to evaluate the process. This study is currently in progress at Oak Ridge National Laboratory under the supervision of the National Council for Air and Stream Improvement. If the feasibility study is successful, the EPA has indicated interest in participating in a pilot plant study of the process. Such a pilot plant study would develop design and economic parameters that would permit scaling up of the system for commercial pollution abatement use.

The conference has recommended that we provide secondary treatment to the bleach plant waste. It should be noted that the bleach plant effluent does not contain suspended solids and, hence, it does not require primary treatment. At this juncture I wish to emphasize that our bleach plant effluent is currently receiving secondary treatment.

Secondary treatment, simply defined, is the removal of soluble BOD using biological treatment processes. (FWPCA Publication No. 1.W.P.-3). The passage of the bleach plant effluent through our biological treatment ponds does indeed furnish adequate secondary treatment for that waste.

We have summarized our pollution abatement progress during 1971 for you. This progress has reduced our BOD discharge to the lowest level realistically attainable through use of today's technology. At this level of achievement no effect of our effluent upon water quality is noticeable below Pollard, Alabama, and indeed no biologically available residues of our effluent have been demonstrated in the Conecuh-Escambia River below this point.

We will continue our efforts to develop a satisfactory process for color removal and to achieve further reductions in BOD as these become possible.

However, we again must disagree with the concept of effluent discharge allotments as contrasted with water quality standards, and more specifically, we question the justification for establishing the 4,850 lbs/day limitation recommended by the conferees at the February 1971 conference. Not only, and importantly, does such a limit discount the pollution abatement improvements we accomplished between the original and second sessions of this conference, but it also overlooks the lower degree of BOD stabilization attainable during the colder seasons of the year.

We respectfully request that the record of this conference be kept open for 30 days so that we may review and respond to further information presented at this session of the conference.

MR. WHITE: Thank you, Mr. Lang. We will be happy to keep the record open. We are doing this in a number of cases.

I would like to observe that as far as effluent limits are concerned, I think they are here to stay. I think we are going to have them industrywide in the near future. Pending legislation addresses this problem. Of course, now, establishing the absolute limit for various mills will be a problem that we will have to face as we go along.

But I do feel that the conferees, I am sure, feel that there was justification in making the decision that was made with respect to the effluent limit for Brewton mill.

MR. LANG: Excuse me.

MR. WHITE: Well, I was just going to go into any questions from the--

MR. LANG: What I would like to do--

MR. WHITE: Would you like to make a response?

MR. LANG: I would like to make three additional short statements.

MR. WHITE: Proceed.

MR. LANG: The record contains a question as to whether any sediment studies or other bottom studies have been made that would identify bottom deposits as containing effluent from Container Corporation of America.

We have a 15-year history of benthic studies--these are the studies of the bottom dwelling animals--made by the stream biologists from the Institute of Paper Chemistry. These show no evidence of paper mill or bark deposits on the bottom of the Conecuh or Escambia River. Limited studies of bottom deposits in Escambia Bay have shown no material that was traceable to the Brewton, Alabama, mill.

The problem of short-circuiting of the effluent movement through our aeration basins was mentioned. We are aware of this. We have done some correction work such as relocation of aerators, et cetera. We are continuing this program. We do monitor the basin using DO profiles and on a routine basis monitor the system both into and out of the aeration system. We are evaluating the system and appreciate the EPA data.

I am sorry Mr. Levin is not here, but I would like to put this in for the record. I would like to respond briefly to several points raised in yesterday's session. It was suggested that Container Corporation of America may have reduced production during the period of the EPA study so as to depress the value obtained for effluent discharge. In order to dispel any doubts on this account, we offer the following production totals for the period of the study preceding the 12-day period and the two 12-day preceding periods.

Twelve days before the study was 945 tons per day. That is a total of 11,347 tons.

The 12 days during the study was 980 tons per day; 11,769 tons.

The 12 days after the study was 1,123 tons per day; 13,475 tons.

The 12 days following this period, 980 tons per day, 11,773.

If there is still any doubt in your mind, I would like to extend you a personal invitation to visit our mill unannounced and you can bring anyone that you wish to to sample our effluent.

MR. WHITE: Mr. Levin, Mr. Lang was answering a question raised yesterday about the production by the mill during the period of the study and the time surrounding it. He gave us some figures for that time frame and that invitation, you know, was to check further to satisfy any problems.

MR. LEVIN: All right.

MR. WHITE: Mr. Traina?

MR. TRAINA: Yes. Mr. Lang, a few questions.

First with regard to these studies you have done on color removal. You mentioned eight systems that you have looked at. With the exception of the last one, the gamma radiation, I assume that the company has rejected the others. Is this on the basis of their technical feasibility, their economic feasibility, or a combination?

MR. LANG: Well,I think on the color removal, Mr. Traina, you will have to agree that the associate benefit to be derived from utilizing these various methods is not commensurate with the expense involved at this time.

MR. TRAINA: Is that saying that they are technically feasible but you don't feel economically that they should be--

MR. LANG: Well, each one of these studies apparently have their shortcoming and I couldn't go into details on each one of them.

MR. TRAINA: But the fact is these other industries you have mentioned, of course we have participated financially and otherwise in these studies--

MR. LANG: That is right, we know--

MR. TRAINA: --are actually in operation and are removing color.

MR. LANG: Yes, sir, but to some degree. I am talking about I don't--some of them--I know of two and one of them I am not sure whether he is putting all his effluent through it or not and the other one I know he is not.

MR. TRAINA: Well, Mr. Lang, you know this conference has gone on record now since the beginning--

MR. LANG: I understand.

MR. TRAINA: --of reducing color, and of course the State of Alabama has committed itself to color reduction at the Brewton plant when technology is available. I would like to suggest that that technology is almost available, it is agreed on a demonstration basis, but it is being employed on a large scale basis now with the plants you have mentioned. And I am concerned that apparently you folks have rejected--

MR. LANG: The plant that I mentioned, I am sorry, I think that was just a pilot plant study, wasn't it?

MR. TRAINA: The one at International--well, you mentioned one in Louisiana.

MR. LANG: Springhill, Louisiana, that is International Paper. That was just, to my understanding, a pilot plant study.

MR. TRAINA: There is a plant in Georgia, Riceboro, of course, that does have mass lime treatment and they are reducing color. We discussed this a year ago, I recall, at the last conference.

This system, you feel, is not economically feasible at this time at the Brewton plant?

MR. LANG: Well, the other one, I am not--I am like Mr. Levin, I am not an engineer either. I am no lawyer nor engineer. (Laughter.) So I do not have all of the information from Riceboro at my fingertips.

The other one that you probably know about, I think the EPA knows real well about, is the Georgia Pacific mill.

MR. TRAINA: Mr. Lang, can I ask that your technical reports and studies be made available to us? I don't believe they have been. With regard to your evaluation of the seven systems that you apparently--

MR. LANG: May I ask one of my people?

I have here Dr. Paul Trout, who is our Environmental Director.

SUPPLEMENTARY STATEMENT

February 17, 1972

Mr. John White and Conferees
Environmental Protection Agency
1421 Peachtree Street, N.E.
Atlanta, Georgia 30308

Gentlemen:

You have recommended that we provide further secondary treatment of our bleach plant effluent and woodyard waste. It is our position that the bleach plant effluent now receives extensive secondary treatment in our system of natural lakes and that the woodyard waste is largely contained by our system of traveling water screens. We have never witnessed any woodyard waste entering the Conecuh River from the Brewton Lake outfall and hence we must believe that any debris which escapes the water screens is trapped by our ponding system.

Nevertheless we wish to cooperate with you on these recommendations and as a consequence we wish to inform you that we have ordered two additional aerators which will be installed in that part of our ponding system which receives both the bleach plant effluent and any woodyard waste that escapes the water screens. We will then be adding air for accelerated treatment of these effluents by means of the additional aerators.

578-B

We have recently learned of a different type of screening system designed to entrap and contain woodyard waste and we wish to inform you that we will review this installation with a view to adopting it if it proves more efficient than the system we currently utilize. In this connection it should be understood that the woodyard waste contributes only 664 pounds of B.O.D. per day to our waste treatment system.

The 1971 session of the conference stated that our B.O.D. allotment would be reviewed when the expansion of our pulping capacity was complete. Please be advised that this completion is imminent and accordingly we respectfully request that you extend our B.O.D. allotment to account for the increment of 150 tons per day added to our pulping capacity by this expansion. The Water Resources Research Institute of the University of North Carolina "Survey of Water Utilization and Waste Control Practices in the Southern Pulp and Paper Mills", cited at the 1971 session of the conference, would establish 60.7 pounds of B.O.D. per ton of product as the industrial norm for our expanded production mix (i.e., 43 pounds of B.O.D. per ton of unbleached pulp production with production at 525 tons, and 78.5 pounds of B.O.D. per ton of bleached pulp production, with production at 525 tons). On this basis, using our total expanded capacity of 1,050 tons of production, the allotment should stand at 6,376 pounds of B.O.D. However, by means of in-plant control, it has been demonstrated that we generate roughly only 54 pounds of B.O.D. per ton of production which the conferees recognized and adopted in setting our current allotment at 4,850 pounds of B.O.D. for 900 tons of pulp production. Logical extension of this reasoning leads us to conclude that our allotment should be set at 5,670 pounds to accommodate the expansion of pulp mill facility.

The remainder of this response will address itself to the problem of color removal which will be the subject of an April meeting with your office. Your recommendation on this subject indicates that the conferees are expecting a firm program for color removal from Container at this meeting. Undoubtedly this recommendation was put forth in the belief that Container would have the results of the Gamma Irradiation study by that time. Unfortunately, it will be impossible for us to make a recommendation with respect to color removal at our April meeting for two reasons. First, the Gamma Irradiation study at Oak Ridge National Laboratory did not commence as scheduled so that we will not have the results of this study by April. Second, and more importantly, the most we can hope for, as a result of this study, is an indication that a pilot plant is justified. Favorable results from a study of this limited scope should not be relied on to establish a full-scale operation. At best the study will furnish us with sufficient information to design a pilot plant, and at worst the study will show that Gamma Irradiation is not a feasible means for removing color from our effluent. At this point all we can report is that Gamma Irradiation of our waste for color removal is the most promising approach we have found to date as a result of our studies on the subject, but this prognosis may largely result from the fact that we know less about this process than we do of others which are currently the subject of government grants.

Both the oral and written statements presented by Container at the third session of the conference document our objections with respect to the systems of color removal now extant. We will not reiterate these here, but we will be pleased to discuss these objections more fully with you at our April meeting. In this connection it has recently come to our attention that one kraft mill operator who evaluated the massive lime system in a pilot plant to treat its mill effluent has concluded that the process is not reasonable or advisable for treatment of bleach plant waste.

It occurs to us that the EPA is privy to a good deal of information being developed on this subject of color removal and we believe that a better understanding can be reached on this subject if we engage in a candid discussion with you in which test results are jointly analyzed. It is possible that the EPA is attracted to the Massive Lime system by reason of the fact that they have information which we lack. We engage in this conjecture because at this juncture, based on the test results we have, it is difficult for us to understand how this process can be considered as a reasonably viable means for treatment of our waste. We believe that our relationship with the EPA, formed as a result of our joint participation in this conference, furnishes precedent for such a free exchange and evaluation of information relevant to this subject. We would appreciate receiving your comments on this suggestion and stand ready to meet with you again at a time of your selection.

CONTAINER CORPORATION OF AMERICA

By Donn Jennings
Donn O. Jennings
Senior Vice President

DR. PAUL TROUT
ENVIRONMENTAL DIRECTOR
CONTAINER CORPORATION OF AMERICA

DR. TROUT: You, as we know, carried on this search for color removal procedures for some years and, in fact, during the last two sessions of this conference we made some reports on this subject, and basically the massive lime treatment at Riceboro, which we are aware of and discussed at last year's conference, is not applicable to our process.

The main problem we feel with this, probably the larger share of our color derives from the bleach plant effluent, which is a highly acidic material, and we are striving for processes in pollution abatement that will not contribute a new pollutant to the effluent. Bleach plant effluent when treated with massive lime does indeed result in the formation of a new pollutant which we feel, even though it has not received much discussion at this point, is not desirable and we, therefore, prefer to class this as technically not feasible for our process, our mix of about 50 percent bleach plant-50 percent nonbleach waste.

MR. TRAINA: What is this pollutant, sir?

DR. TROUT: Calcium chloride.

MR. TRAINA: Excuse me?

DR. TROUT: Calcium chloride.

MR. TRAINA: Do you think this would have--your biologists have told you this would have a deleterious effect on the river with calcium chloride in it?

DR. TROUT: I think any new foreign material is undesirable in any watercourse. We do feel that--

MR. TRAINA: But you can remove the color by this process?

DR. TROUT: --the gamma ray--pardon?

MR. TRAINA: You can remove the color by this process?

DR. TROUT: I would say you could get a degree of color removal. We have seen this demonstrated at the International Paper Company pilot plant.

MR. TRAINA: Have you in your pilot studies made any evaluations of if you went to this method how much TOC you would remove along with the color?

DR. TROUT: We have done some work in this area and much of the color relates to a TOC, so certainly there would be some TOC removal as there is also BOD removal by a massive lime treatment.

MR. TRAINA: Then we could possibly get at this TOC problem, which you know has been gnawing at us for several years now, if we addressed the color removal problem. And I would like to suggest here that maybe we need to get together with some biologist to evaluate whether or not calcium chloride is going to be any worse in that river than the TOC is now, if we can get at TOC and color and maybe take the calcium chloride as it comes later.

But it seems to me that a system now has been developed for application to your mill.

DR. TROUT: May I make a comment on TOC? We also addressed this problem or this method of analysis at last year's conference.

I think that the TOC is a tremendously useful monitoring test in proper context, it is quick, easy to run, reproducible, but it has the very tremendous drawback of not measuring simply the biologically available carbon. In other words, the TOC test, as you know, measures a combination of the biologically available and the biologically unavailable carbon. In the eutrophication of Escambia Bay or any other body of water we have to be concerned with that source of nutrients or those nutrients that are available for bacterial and algal action, so that it is somewhat misleading to be concerned exclusively with total organic carbon when really what we are talking about is that carbon which contributes to the deterioration of the watercourse.

An easy way to break it down is to suggest that if you took a charcoal briquette, ground it up and threw it in your swimming pool, an average-sized backyard swimming pool, also threw a half a pound of sugar in that swimming pool, you would have a total organic carbon of about 3 ppm. However, only half of that, the one and a half parts, is biologically available, the sugar, which could grow microorganisms. The other would simply settle out to the bottom and act as sand.

MR. TRAINA: Oh, we have gone into these discussions, you know, many times, and I don't think it is appropriate here. I appreciate that.

However, here we are with a treatment system that is being demonstrated elsewhere that apparently you folks have looked into and it just seems to me that you are at the verge or should be at the verge of implementing a system that is being proven right now to get at a problem that has plagued this group and other groups, and specifically that is color and TOC. And also this would solve your problem with regard to another recommendation of this conference regarding the treatment of bleachery wastes, again which has been a problem for us over these past few years.

DR. TROUT: Yes, we--

MR. TRAINA: Here you have a system that can address all three of these things, and as I understand your comments, the only thing that is holding you back is you are afraid of creating a possible other problem in the discharge of calcium chloride.

DR. TROUT: Oh, no, this is not the sole factor, and indeed we are considering further evaluation of the various lime treatment processes, either the massive lime or the stoichiometric lime.

MR. TRAINA: Mr. Lang talked about going into this gamma radiation thing--

DR. TROUT: Right.

MR. TRAINA: --which I really don't know anything about.

DR. TROUT: And I would like to make a comment on that, because we feel at this point--and of course we may be totally wrong, but until we have this feasibility study, which is a three months study, we won't know that. And this does offer the process or a possible approach that would give a treatment of refractory materials, in other words the TOC that is not biologically available, permit that to be handled and simultaneously destroy the color without adding any new contaminants to the watercourse, which I think has got to be a goal of everyone that is concerned with the social good. We cannot add anything new to any stream. And we do feel this has tremendous potential at this point.

MR. WHITE: Can I get clarification on a point here?

You say you are going to have a feasibility report in three months from today?

DR. TROUT: The contract which began January 1 is for a three-months feasibility study by Dr. Case at Oak Ridge.

MR. WHITE: Do you feel, then, that you will have all the answers to the questions in your mind concerning this process?

DR. TROUT: Well, I would be a fool to promise all the answers at that time. We will--

MR. WHITE: That was a bad choice of words.

DR. TROUT: We will know at that time, however, whether the process is feasible,and if so, it will stop us from making a grievous mistake in going precipitously into another method of treatment even though that other method may be the best available at the moment.

MR. TRAINA: Dr. Trout, I am going to have to pursue this a little bit, because here again I think we have so many technical problems that are unsolvable and I think we are at the point here of having one that can be solved with the system, I am talking specifically about this lime system, that is now being proven. EPA has put considerable money into research, the industries involved have put considerable money into research, and it does concern me that you feel at this point you are not ready to do this because of this question of calcium chloride and that you are now going into another system which may end up with a radioactive byproduct, I don't know, I really don't know anything about that.

DR. TROUT: No, it won't.

MR. TRAINA: But you know, we can just keep looking at systems and never get to making a decision about using one. Now, all of us, you know, we don't have all the answers and it would be nice to tie down every single possible byproduct of what we do, but here again you have got a system that has been proven and I just can't see reluctance, apparent reluctance, on your part to implement a lime system for the removal of color, TOC and treatment of bleachery wastes at the plant, which all three this conference has directed some controls be placed on.

DR. TROUT: I can appreciate your sense of parenthood on this process and the EPA interest in the process, but I am honestly convinced that it is not the satisfactory process that you feel it is and I do not feel that it warrants wide introduction into the kraft industry.

MR. TRAINA: We can't solve this here.

Could I ask that we be given copies of all your technical studies, your evaluations of the eight--seven systems I guess, if you haven't finished the eighth one, and your reasons why they are unacceptable at this time?

DR. TROUT: Surely.

MR. TRAINA: Can this be given to us within a 30-day period?

DR. TROUT: Surely.

MR. WHITE: Just logistically I want to clarify something.

Is this a great wealth of material or what? I mean what are we talking about by way of paper?

DR. TROUT: Well, much of it is not of our own research activity and--

MR. WHITE: Let's go off the record just a minute.

(Off the record.)

MR. WHITE: Let's go back on the record.

If you would, then, submit it directly to the technical staff or Mr. Traina for his perusal and we won't make it a part of this record at this time.

MR. TRAINA: I can also assume that we can get together with our technical staffs to review these bleachery studies.

DR. TROUT: Oh, absolutely.

MR. TRAINA: We have had good relationships with you and I am sure this will continue in the future.

DR. TROUT: We always appreciate the opportunity to learn from you.

MR. TRAINA: All right.

MR. WHITE: Mr. Levin.

MR. LEVIN: I defer to you, Mr. Ravan.

MR. RAVAN: Dr. Trout, just a quick question that Mr. Lang brought up.

I don't believe, generally speaking, that enough work has been done, especially in the sense of recovery, with regard to sediments, and it was interesting to hear about the benthic studies that you have conducted over 15 years or some parts of your industry. I wonder if we could also see those studies?

DR. TROUT: Yes, they have been made available every year to the Alabama Stream Improvement Commission and either they have copies or we could send copies to you.

MR. RAVAN: I am especially interested in how wide the--how much in depth you have gone here. Did you actually go out into the bay, Escambia Bay?

DR. TROUT: Our commission studies from the Institute of Paper Chemistry normally go only to Escambia Bay. There was some brief work, very preliminary, and I believe the Environmental Protection Agency in the early days of the original study also did some bottom work. Now, I, of course, can only mention ours.

MR. TRAINA: For clarification, Mr. Ravan, these were biological studies and not sediment studies. In other words, nobody characterized, actually, the sediment chemically. They were biological studies of biota that reside in the bottom materials. Is that correct? These have been biological studies and not sediments?

DR. TROUT: Those were the reported studies, yes.

MR. RAVAN: That was my understanding.

DR. TROUT: Perdido Bay was also chemical bottom studies.

MR. RAVAN: And the thrust of my question here is simply that we need more information, and if you have got technology or if you have got method or something that we might latch onto, we would appreciate it.

DR. TROUT: Ours is very sketchy, but certainly whatever we have is freely available.

MR. RAVAN: Thank you.

MR. TRAINA: Just one more question.

At this point in time, Dr. Trout, the plant has no plans to do anything to their bleachery wastes, at this point in time?

DR. TROUT: We have no plans to install a massive lime process for treatment, if this is what you are asking.

MR. TRAINA: Or any other system at this time?

MR. LANG: Yes, sir. Could I make one--

We have some more aerators on order and we are putting in this system. They are supposed to be delivered the first week in February.

MR. TRAINA: Will these be put in natural ponds?

MR. LANG: No, we are going to put them in--yes, in our natural pond system.

MR. TRAINA: So they will be--

MR. LANG: They will be in this bleach plant waste, yes, sir.

MR. TRAINA: When will those be into operation?

MR. LANG: We are supposed to receive them the first week in February and it will probably take a month to install them, a month to six weeks.

MR. TRAINA: And I assume that you will be monitoring it?

MR. LANG: Yes, sir.

MR. TRAINA: And give us the information on the results of those?

MR. LANG: We will go around and study it as soon as we get them in, start running some background studies.

MR. TRAINA: Thank you.

MR. WHITE: Mr. Levin has a question.

MR. LEVIN: Dr. Trout, I don't know how else to ask this question, but can you conceive of anything being added to the water north of your plant that would be in any way contributing to the eutrophication of Escambia Bay? You have been here the entire two days, haven't you?

DR. TROUT: Yes, sir.

MR. LEVIN: And you heard what maybe to you was the dumbest question you ever heard in your life that I have asked about these parameters and tests, and so forth, that perhaps there are other things that we should be concerned with that we are not even testing for. Can you see the fact that, for example, Greenville is using one of the tributaries of the river as a discharge of its effluent which could possibly be in any way contributing to the eutrophication of the bay, knowing what you know about the water at the point where your plant is? Or do you think that this and East Brewton are the only two things we ought to look at insofar as the State of Alabama is concerned and its role in the problems of Escambia

Bay?

DR. TROUT: I certainly am not familiar with the river above the Brewton mill, so I am naturally deferring to Mr. Crockett. I can't honestly conceive of a difference in water quality based on the studies presented here today that would show there is any material in the Conecuh River or its tributaries that is different from natural organic runoff.

MR. LEVIN: Now I will ask you the same question about your plant. Is there anything that your plant is discharging into the Escambia River, or whatever you call it up in Alabama, that is in any way contributing to the problems that we have in Escambia Bay?

DR. TROUT: We feel, based on our own tests and the information we have seen, no.

MR. WHITE: Mr. Crockett.

MR. CROCKETT: Dr. Trout, on the question of Mr. Levin concerning, let's put it, the quality of water at your millsite near Brewton, could you make any comment on the basis of the use of the Conecuh River as a source of water supply for the manufacture of products including food board?

DR. TROUT: Yes. Of course the--

MR. CROCKETT: Pardon me. The treatability, do you have to provide any special treatment, water treatment, to condition this water for appropriate use in your processes?

DR. TROUT: Yes, we do use the Conecuh River as our water supply for manufacture of both bleached and unbleached paperboard. The bleached paperboard normally goes into food board production, packaging of foods.

It is necessary to treat this water primarily for color removal. Most of the southeastern United States waters are highly colored naturally and it is essential to remove this color and whatever natural sediment that is present in order to have the highest brightnesses that we can obtain in our bleaching process.

I don't know if that has answered your question or not.

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: Dr. Trout, just let me make one comment and then I have got a couple of questions. I was interested in your definition of TOC. That is about the third one that I have heard and they seem to all be different.

I gather that you are familiar or I mean you know the background, you have been with the Container Corporation up there and you have got--I am sure Container, like many industries, monitors the river as well as their own industry, I mean within their own industry. Within the past two or three years have you seen any change in the water quality above the Brewton mill?

DR. TROUT: I have to admit something that I hoped I wouldn't have to and that is that I am from Philadelphia. (Laughter.) Because of that, Mr. Mauriello--

MR. LEVIN: How did George Wallace let you get into Alabama? (Laughter.)

DR. TROUT: Because of that, Mr. Mauriello, I am not as familiar with our incoming water tests, I am not completely familiar with it. We do have to monitor the intake water because that is how we adjust the chemicals that we feed for our water treatment.

I think possibly, if you would like to be inflicted with another one of us, I could call John Fay, our Technical Director from the Brewton mill, and have him answer your question.

MR. MAURIELLO: I would like to have an answer to the question.

MR. WHITE: Fine, if Mr. Fay will--

MR. MAURIELLO: I have got another question to you.

DR. TROUT: All right.

MR. MAURIELLO: Well, let's get--

MR. LEVIN: You are from Philadelphia too, Mr. Fay?

MR. WHITE: Let's get off--

MR. FAY: No, sir, I am from Brewton.

MR. LEVIN: Oh. Well, O. K., we will listen to you.

MR. FAY: I was born in Wisconsin.

MR. WHITE: Mr. Fay, if you would, step forward to the mike and identify yourself.

JOHN FAY, TECHNICAL DIRECTOR
CONTAINER CORPORATION OF AMERICA
BREWTON MILL, BREWTON, ALABAMA

MR. FAY: My name is John Fay. I am Technical Director of the Brewton Mill in Brewton, Alabama. I live in Brewton.

Number one, we report to the State of Alabama both in our tests and the quality of the river. Our tests do not indicate that the river quality either above as measured at Highway 41, which is above Murder Creek, which is above Brewton, or the tests at Pollard or at Century Bridge indicate a deterioration of the river quality. In fact, I would say that the quality of the river has improved some and this related to DO levels and may be related to flow and it is probably indicated by the IPC studies.

Our effect in the river is less than what we have had previously and I think that just about summarizes it. The information is all available at the State of Alabama.

MR. WHITE: Mr. Crockett has a question.

MR. CROCKETT: Mr. Fay, the Container mill at Brewton does have the capability of analyzing for TOC, do they not?

MR. FAY: Yes, sir.

MR. CROCKETT: And is this a routine analysis that you perform not only on your wastes but also on the Conecuh River both above and below your mill's discharge?

MR. FAY: Yes, sir.

MR. TRAINA: May I ask a question?

MR. MAURIELLO: You asked my question.

MR. WHITE: Well, just a minute.

Mr. Mauriello.

MR. MAURIELLO: I had a couple other questions.

MR. WHITE: Of Dr. Trout?

MR. MAURIELLO: Maybe Mr. Fay will have to answer them too.

MR. TRAINA: May I just proceed on that one question?

MR. WHITE: Go ahead.

MR. TRAINA: Mr. Fay, I believe you were here during a presentation made by one of the industries with regard to COD levels and TOC levels--

MR. FAY: Yes, sir.

MR. TRAINA: --increasing since 1968. Do you have any--

MR. FAY: I have no comment. The TOC, of course, we have only had since the previous session of the conference, so we have no data going back to 1968 and we would have no COD information. Our TOC data doesn't go back that far so there would be no way of knowing.

MR. TRAINA: Just by your knowledge of the area, would you have any reasons why you think that that might have increased since the 1968 period, those values?

MR. FAY: From my knowledge, I know of no reason.

MR. WHITE: Mr. Mauriello.

MR. MAURIELLO: Mr. Crockett asked part of my question, whether the mill or the analytical procedures, whether you use TOC as part of the--as a parameter that you use for measurement and I gather that you do for an evaluation of the treatment process and background and monitoring of the river. Is this basically correct that you do use TOC in that way?

MR. FAY: That is correct.

MR. MAURIELLO: How do you evaluate the TOC? What kind of evaluation do you place on TOC when you get results? I mean what do you look for when you get a TOC result in the plant? What is the interpretation that you place upon it?

Dr. Trout just mentioned that it is a measure of both the biological and the nonbiodegradable portions of carbon. What do you use it for? What is the reasoning for it?

MR. FAY: Well, the reason that we started using it was because it was introduced at the sessions of this conference.

MR. WHITE: I might interject, it was a recommendation of the conference that they monitor their TOC's and they have been sharing this information with us and I don't know that we have formed any conclusions yet on it.

MR. MAURIELLO: The other question I have, and I don't think it has really been answered and maybe you can't answer this, but the report of EPA indicates that the BOD levels above the plant are half that of what they are below the Container Corporation plant in the river. Is there a reason for this?

MR. FAY: Maybe I am misreading the--

MR. WHITE: Would you restate it? I missed that too, Mr. Mauriello.

MR. MAURIELLO: Well, I am looking at Table V, which says that for Conecuh River at Highway 41 near Brewton, the average BOD is 0.8, and yet at the Escambia River at Highway 4 near Century it is 1.9 ppm BOD.

MR. FAY: Table 5?

MR. CROCKETT: You may want to take this.

MR. FAY: There are several reasons for that. One is if you compare Pollard to Highway 41 you will find that within the meaning of BOD they are the same. You also have other streams and things coming in there. I think you would have to look at those. Pollard, I believe, is CO 6.

MR. MAURIELLO: What you are saying is that there are possibly, then, other sources that are entering the stream below the plant discharge but prior to it reaching Highway 4? Is this what we are saying?

MR. FAY: Well, you have to look at, for example, Big Escambia, which is 1.6, and so on. That is a possibility.

MR. MAURIELLO: The other question that I had I think has already been answered and that is concerning the bleachery wastes, so I will pass that.

MR. WHITE: Any other comments or questions?

If not, thank you very much, gentlemen.

MR. WHITE: Let's go off the record a minute.

(Off the record.)

MR. WHITE: Let's go back on the record.

I believe Mr. Ravan has a comment or two.

MR. RAVAN: Mr. Chairman, I did want to make this comment.

It might be interesting to let the record reflect that in fact the original conference and this conference reconvening has been attempting to get at perhaps major sources and it is my feeling that there is perhaps information available from study at the Federal level that would indicate that in addition to these major sources, while they are major, there are also some minor sources, and I suggest to the Chairman that we review this possibility and if such is the case that it be made a part of the record within the next 30 days. I am talking about the minor contributors, perhaps, to the problem, which when added up as a total might be a significant factor.

MR. WHITE: Well, I think certainly we can get those in the record and a source of information of this sort would be the information developed under the Refuse Act permit program.

If we do this, we need to, I guess, allow some time for comments and at least for some clarification of what is involved in these.

I think that I will propose that we make available to the conferees within 15 days a list of the total industries discharging anywhere throughout the basin and give it to the individual conferees for a chance to comment within 15 additional

Table 1
Discharges to Escambia or Pensacola Bays or Tributaries Thereof

Discharger	Treatment	Receiving Waters
Brewton, Ala.	Waste Stabilization Pond	Murder Creek
E. Brewton, Ala.	None	Murder Creek
T. R. Miller Co., Inc. Brewton, Ala.	Settling-evaporation & percolation ponds	Murder Creek
Container Corp. of America, Brewton, Ala.	Aeration & oxidation ponds	Conecuh River
Century, Fla. & Alger-Sullivan	Waste stabilization pond	Swamp to Escambia River
Jay, Fla.	Contact stabilization	Bray Mill Ck. to Escambia Riv
Boise Cascade Corp., Cantonment, Fla.	Process wastes to holding tanks for septic tank draining, surface drainage - no treatment	Escambia River
Monsanto Chemical Corp. Pensacola, Fla.	Deep well injection & inplant controls - indus. waste; secondary-domestic waste	Escambia River
Gulf Power Co., Pensacola, Fla.	Settling ponds - flyash; lagoon recirculating	Escambia River
University of West Florida	Contact stabilization	Escambia River
Scenic Hills Country Club Estates	Extended aeration	Bayou to Escambia River
City of Pensacola Northeast Wastewater Treatment Plant	Secondary (trickling filter)	Escambia Bay
Ellyson Field (Navy)	To Northeast WTP	Escambia Bay
Westinghouse Corp.	To Northeast WTP	Escambia Bay
American Cyanamid	Settling ponds - indus. waste; secondary-domestic waste.	Escambia Bay
Air Products	Settling & biol. treatment industrial waste; septic tanks - domestic waste.	Escambia Bay
City of Pensacola Main St. Wastewater Treatment Plant	Step feed-step aeration	Pensacola Bay
Newport Division - Tenneco Chemicals	To Main WTP	Pensacola Bay

Discharger	Treatment	Receiving Waters
Ashland Chemical Co.	To Main WTP	Pensacola Bay
Armstrong Cork Co.	To Main WTP	Pensacola Bay
Escambia Treating Co.	Evaporation pond - overflow to Main WTP	Pensacola Bay
U.S. Naval Air Station	Physical, chemical & biological.	Pensacola Bay
Naval Air Station - vessels in port	None	Pensacola Bay
American Creosote Co.	Evaporation-percolation ponds	None
Moreno Courts Sub-division WTP	secondary (aeration)	Bayou Chico via Jones Swamp Creek
Warrington (West Fla. Utilities)	Secondary (aeration)	Bayou Chico via Jones Swamp Creek
Corry Field (Navy)	Secondary (trickling filter)	Bayou Chico via Jones Swamp Creek
Pen Haven Sanitation Co.	Secondary (trickling filter)	Bayou Chico via Jackson Branch
Milton, Florida	Secondary (trickling filter)	Blackwater River
Whiting Field (Navy)	Oil & grease trap	Clear Creek & Coldwater River to Blackwater River

days to get it clarified for the record.

Does anyone have any observation or comment to make on that?

MR. CROCKETT: The only observation or comment, that we did not include a report on gravel washes. We do have some in Alabama. We have reported on it previously and the latest inspections reveal that they are working satisfactorily.

If you are going to include industries of that type, they should be made basinwide, the inclusion.

MR. WHITE: Fine. We will make it basinwide.

MR. CROCKETT: And perhaps we should define, I don't know whether we can do it right sitting here or not, to what extent we should go.

MR. WHITE: Well, I think that as far as we are concerned now we would go as far as the information that we have submitted to the Corps of Engineers and to EPA under the Refuse Act permit program, and I will--

MR. TRAINA: Mr. Chairman, would you want to explain that to include municipalities as well?

MR. WHITE: Yes, I think we should. And I understand from Mr. Crockett's testimony before that he included this in the original report, but we could have an update on what has been done by all the municipalities.

MR. CROCKETT: I would like to correct that. I found I was in error, that the latest submittal on municipal wastes other than in the area which is considered to have an interstate effect was not made to the 1970 session of this conference but was made in 1969 at a hearing here in Pensacola called by the former Governor Kirk. I promised Mr. Levin to make that available, that it was available in the transcript of the session. It isn't. And I would include municipalities in this report that we are talking about, but I want more than 15 days.

MR. WHITE: How much time would you need, Mr. Crockett?

MR. CROCKETT: I would like to have it within 30 days. I would like to have 30 days to do it. Primarily we have several important matters coming up, including meetings of our commission, that we must prepare for and participate in. But we will make an update on the municipal wastes within a 30-day period.

MR. WHITE: All right, fine. Well, then, we will just set a 30-day period for the submission to the conferees of all of this information, including that developed by the Corps of Engineers, EPA, and the State of Alabama on municipalities.

MR. RAVAN: Is that all right with the State of Florida? Because I know this exists in both cases.

MR. MAURIELLO: We have no objections. It is all in our permit system. We will just pull it out.

MR. WHITE: Then if there are no objections, we will proceed that way.

Are there other comments or questions?

MR. RAVAN: I would like to make one further comment, Mr. Chairman. If you would, I think it would be a matter for the record and for the public at large that you might make a statement as to the availability of the information that we will be gathering as far as the public is concerned.

I will say that this will be on file with the Environmental Protection Agency and each of the States involved and would, of course, be available for review for anyone who desires to do so.

I believe Mr. Levin indicated he had a comment to make.

MR. LEVIN: Yes. We have sat here now for a day and a half and unless you all think I am a complete fool, when we talk about Philadelphia and northern experts and things of this nature, I am not trying to relive the Civil War. Being a trial lawyer, I happen to know how I try a lawsuit when it comes time for needing an expert. This is not to say that these experts are not qualified, capable and intellectually honest men. It is just that any time you have got two people involved in a particular field you are apt to get two different opinions.

Now, we even have a book amongst the trial lawyers that goes about telling us the names and addresses of these experts and how we can go about finding them and then naturally we call the ones and we keep calling them until we find the ones that tell us what we want to hear. Now, that is no big secret. I mean let's face it. And then the defense counsel will do the same thing. Obviously he is not going to hire an expert that is going to come down and lose the case for him. It just makes sense.

I have heard several definitions of experts. One of them is it is someone from out of town with a briefcase. The second definition of an expert is somebody who knows more and more about less and less until he ends up knowing everything about nothing.

But what I am trying to say is this, that the reason why I questioned the location of the place where the expert came from was only to the extent of where it just seemed to me a little bit unusual, especially when I heard the doctors testify that a 17-degree above ambient discharge contributed nothing materially to the eutrophication of that bay. It just seemed to me unusual that Gulf Power had to go all the way to the State of Pennsylvania to find somebody to come in here and testify as to somebody else's opinion.

So while I enjoy a good joke, Dr. Trout, and I certainly appreciated what you had to say, I don't want you to think that I am that much of a fool that a place where a person comes from has anything to do with his testimony only to the extent which I just mentioned. So I hope you understand that.

MR. WHITE: Are there any other comments by the conferees?

If not, we will recess now in just a minute and plan to get back together in the morning at 9 a.m. before we get into another meeting, a progress meeting on the Perdido Bay situation, and will at that time come forward with conclusions and recommendations and findings of the conferees.

Before leaving today, I would like to thank each and every one of you who participated and all of you in attendance for coming and say that we have a pretty big job in front of us now trying to decide where to go with this problem. As you know, we heard a good bit of testimony. And we will give it due deliberation and come up with our best findings on this.

We stand recessed until 9 a.m. in the morning.

(Whereupon, at 2 o'clock an adjournment was taken until 9 o'clock, Wednesday, January 26, 1972.)

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MORNING SESSION

WEDNESDAY, JANUARY 26, 1972

(9 o'clock)

MR. WHITE: Let's go back in session. And I should point out for you here today who weren't here yesterday that this is the tail end of the Escambia Bay conference that was held Monday and Tuesday.

The conferees met in executive session and I am happy to report unanimously agreed on revised conclusions and recommendations,which I will read now.

The numbers and sizes of fish kills in Escambia Bay during 1971 have provided continued evidence of critical water quality conditions. The seriousness of the problem requires that stringent measures be taken to enable the bay to regain the natural ecological balance needed to make this water body a resource reather than a detriment to the State of Florida.

The conferees arrived at the following conclusions:

1. General progress continues to be made in reducing waste loads entering the bay. The conferees take special note of the achievements of the Container Corporation of America plant in meeting loading requirements established by the second session of the conference.

2. The conferees are concerned that plans submitted by Monsanto, Air Products and American Cyanamid plants do not appear to be adequate to meet conference recommendations.

Conclusions and Recommendations

3. The conferees commend the city of Pensacola in financing and providing interim modifications of their Northeast sewage treatment plant to meet the recommendations of the conference.

4. While Monsanto has discontinued the use of polychlorinated biphenyls, the continued presence of this substance in the waters and sludges of Escambia River and Bay remain a concern.

5. The report of the Menhaden Conference conducted under the auspices of the Gulf Breeze Laboratory provided valuable information to the conferees regarding the life cycle of menhaden as well as the problems associated with the cleanup of these fish in Escambia Bay.

6. The conferees recognize the progress made by Container Corporation of America in studying methods for removing color.

7. Information provided to the conferees strongly indicates past dredging activities in the Mulat-Mulatto Bayou area have contributed to the fish kills which have occurred. The efforts on the part of the Department of Transportation in studying the effects of these dredging activities should provide a basis for specific recommendations for alleviating this apparent problem.

8. The Corps of Engineers has informed the conferees that it is without authority or funds to acquire upland spoil areas or sites in the Escambia Bay area. The conferees are of the opinion that authority should be sought to permit the Corps to dispose of spoil material in areas that do not adversely affect the bay.

9. The evaluation of the effects of thermal discharges from Monsanto and Gulf Power Company plants on biota of Escambia River and Bay are not conclusive, and further studies are indicated.

10. The conferees commend East Brewton, Alabama, for retaining an engineer and developing a grant application for construction of a waste treatment facility to meet conference requirements. The conferees note with concern that Century, Florida, has not taken similar actions.

11. In addition to the control measures that must be taken by the municipalities and industries in the area, information provided to the conferees shows that a positive program from bay restoration must be undertaken. While many technical questions remain unresolved, the conferees recognize the need for action in implementing its previous recommendations as well as undertaking additional measures directed toward restoring the ecological balance of Escambia Bay.

Conclusions and Recommendations

The general heading of Recommendations:

To reduce or eliminate the accelerated eutrophication of Escambia Bay and Mulat-Mulatto Bayou, and to provide water quality suitable for a wide diversity of desirable uses, the conferees make the following recommendations without prejudice to the rights of the States of Alabama and Florida to enact more stringent requirements. These recommendations would be accomplished by not later than December 31, 1972, except as otherwise specified.

1. There shall be reductions of 90 percent 5-day BOD, 94 percent nitrogenous wastes, and 90 percent phosphorus wastes discharged to Escambia River and Bay from major sources in Florida, including American Cyanamid Company, Monsanto Company, and Air Products, Inc. Due to the distance from Escambia Bay of Container Corporation of America's plant site, a reduction of 90 percent 5-day BOD waste will be required. These percent reductions permit the following allowable waste effluents.

Let me deviate from the reading to point out that this recommendation is in essence the same as the previous recommendation with some very minor modifications.

Container Corporation: 5-day BOD 4,850 pounds, total nitrogen, not applicable, total phosphorus not applicable.

Monsanto: BOD 605 pounds, total nitrogen 248 pounds, total phosphorus 46 pounds.

American Cyanamid: 5-day BOD 425 pounds, total nitrogen 323 pounds, total phosphorus not applicable.

Air Products: 5-day BOD 17 pounds, total nitrogen 477 pounds, total phosphorus 35 pounds.

The foregoing allowable waste loads shall be obtained by December 31, 1972. If further investigation shows that these limits are excessive, Monsanto, American Cyanamid, and Air Products must develop a plan to completely remove their discharges from the bay.

There shall be maximum feasible reduction of carbonaceous organic material. All waste discharges shall monitor effluents to ensure reductions and conduct feasibility studies and submit a plan of abatement for carbonaceous waste to the conferees by February 15, 1972.

Container Corporation shall provide further secondary treatment of bleach plant and woodyard wastes.

2. The Environmental Protection Agency and the State of Florida technical staffs shall schedule a series of in-plant

investigations into treatment techniques and process control of the Monsanto, American Cyanamid, and Air Products plants to determine the effectiveness of present attempts to meet conference requirements. A report of such investigations shall be made to the conferees as soon as possible, but not later than May 1, 1972. These investigations are not in lieu of continued efforts by the company to effect the results as outlined in paragraph 1 above. In addition, any other industrial waste sources which may discharge into Escambia River and Bay or its tributaries shall be reported on, with recommendations for abatement.

3. The city of Pensacola shall submit to the conferees by May 1, 1972, operating data on the effects of the plant modifications made to the Northeast sewage treatment plant showing its compliance with the recommendations of this conference. The city of Pensacola and the County Commissioners of Escambia shall report to the conferees by May 1, 1972, the status of the 5-year master plan developed by the Escambia-Santa Rosa Planning Council and adopted by the city and county. The status report should include estimated dates for the implementation of the 5-year plan.

4. The Environmental Protection Agency's Gulf Breeze Laboratory shall monitor the effluent and adjacent areas of the

Monsanto plant to determine the presence of any polychlorinated biphenyls and provide monthly reports to the conferees.

5. The conferees recognize the critical situation concerning the life cycle of menhaden and are forwarding copies of the report of the Menhaden Conference to the National Oceanic and Atmospheric Agency and the Southeast Fisheries Association urging a plan for protection of this valuable commercial species.

Because of the additive problems attendant to dead fish decomposing and recycling nutrients into the bay, as well as presenting a health hazard, the conferees recommend that the Governor of the State of Florida take actions as he deems necessary for the immediate removal of such fish in the future until such time as corrective measures are completed.

6. Color in the Escambia River at the Alabama-Florida State line as measured at the Highway 4 Bridge near Century, Florida, shall be reduced to levels meeting Alabama, Florida, and Federal standards. The conferees require that the Container Corporation of America shall present a progress report by April 1, 1972, with its recommendations for color removal.

7. It is recognized the Department of Transportation of the State of Florida has retained a consultant group to

evaluate and make recommendations concerning the Mulat-Mulatto Bayou and the I-10 Canal System. The Department of Transportation shall provide the conferees by March 1, 1972, with their evaluations, recommendations, and a plan of implementation for corrective measures as recommended by their consultant. Upon approval or modification by the conferees, this plan will be referred to the Governor of Florida for appropriate action.

8. No further construction dredging shall be permitted in Escambia Bay and Mulat-Mulatto Bayou until the artificial buildup of organic sediment deposits ceases and stabilizes. Maintenance dredging of existing channels shall be by hydraulic pipeline or by hopper dredge. Disposal of all dredged materials from hydraulic dredging shall be done in a manner and to spoil sites acceptable to the conferees.

9. The conferees recommend that the Environmental Protection Agency in cooperation with the University of West Florida and the State of Florida conduct field studies to determine the effects of thermal discharges from Monsanto and Gulf Power Companies on the biota of Escambia Bay and River and report their findings to the conferees by September 15, 1972.

10. Century, Florida, and East Brewton, Alabama, shall install by not later than December 31, 1972, secondary waste treatment facilities acceptable to their respective State

water pollution control agencies. These municipalities shall report to their respective State water pollution control agencies on progress being made beginning March 1, 1972, and each 90 days thereafter.

11. Because of the many questions which have been brought to the attention of the conferees regarding the overall ecology and over-enrichment of Escambia Bay, the conferees recommend that a recovery study team be organized under the overall direction of the Environmental Protection Agency. This recovery team shall include the University of Florida System, working through the University of West Florida, the Florida Department of Pollution Control, the Environmental Protection Agency, and any other public or private agency, institution, or industry with an essential contribution to make. Specific plan for the recovery study--including staffing, financing, and basic investigative methods--shall be submitted to the conferees by April 1, 1972. Independent plans for gathering information in the next several months that would complement the basic objectives of the recovery program are encouraged to proceed. Among other things the team shall consider the desirability of diverting the White River or a portion thereof into Escambia Bay.

This concludes the development and proposal of the revised conclusions and recommendations. And as I pointed out to you at the beginning of the conference, these conclusions and recommendations must be submitted to the Administrator of the Environmental Protection Agency for his approval. Prior to that time they will serve as administrative guides to all of the participants in the conference. We would hope that approval of the conclusions and recommendations will be forthcoming within the next 30 days.

I would now like to call on the other conferees to see if they have any statements to make at this time.

Mr. Levin?

MR. LEVIN: No.

MR. CROCKETT: Could we go off the record for just a minute?

MR. WHITE: Off the record.

(Off the record.)

MR. WHITE: Let's go back on the record.

Mr. Crockett, do you have any statement or observation?

MR. CROCKETT: I think that this report and summary and conclusions you have read show that there has been considerable progress and I would like to express appreciation of Alabama for that progress.

Conclusions and Recommendations

MR. WHITE: Thank you.

Mr. Traina?

MR. TRAINA: I have no comments to make.

MR. WHITE: I would like to clear the record on something that I said yesterday with respect to a report submitted by the Southeast Fisheries Association or in fact the promise to submit a published report within 30 days, that this will be accepted into the record and made a part of the transcript that will receive distribution.

With that, I would like to thank again all of the participants and attendees of the conference and give a special thanks to Dr. Tom Hopkins and Dr. Duke, who is Director of the Gulf Breeze Laboratory, for their valuable assistance.

We stand adjourned.

(Whereupon, at 9:15 o'clock an adjournment was taken.)

RESULTS OF A CREEL CENSUS OF THE LOWER ESCAMBIA RIVER SPORTS FISHERY

W. Carroll Hixson
Jorma I. Niven
Thomas S. Hopkins

Published and Distributed
As a Community Conservation Project

by the

BREAM FISHERMEN ASSOCIATION
1333 North Spring Street
Pensacola, Florida
32501

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W. Carroll Hixson

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December 8, 1971

Bream Fishermen Association
1333 North Spring Street
Pensacola, Florida 32501

FOREWORD

A major problem in evaluating the ecological status of an area is generally the lack of background information against which changes, whether for the good or the bad, can be measured. This report presents such information with respect to the status of sports fishing in the lower Escambia River near Pensacola, Florida.

The basic creel census data were collected in the spring of 1970 by members of the Bream Fishermen Association (BFA). During this period, these individuals spent nearly 1000 manhours at various fish camps assisting in the completion of the creel survey forms. The following officers and members of the BFA contributed sacrificially of their time and energy in completing this project: C. A. Lowery-President, G. T. Turnipseed-Treasurer, J. R. Bowman, E. L. Bridges, Jr., A. N. Dennis III, A. N. Dennis, Jr., T. A. Griner, Wayne C. Hixson, J. A. Martin, J. W. Norman, and D. H. Russell. In addition we wish to acknowledge the indispensable assistance of the BFA wives and children.

Particular thanks also go to the many local sports fishermen who participated in the creel census program. Without their willing and cheerful support, it would not have been possible to implement the study.

This report is published and distributed as a community conservation project by the Bream Fishermen Association, 1333 North Spring Street, Pensacola, Florida 32501. It is our earnest hope that fishermen as well as conservationists, biologists, and others, officially or unofficially interested in the maintenance of good sports fishing, will find these data of value. For the convenience of those who wish a cursory review of the findings, a short summary is included at the end of the report.

W. Carroll Hixson, Secretary
Bream Fishermen Association

Jorma I. Niven
Bream Fishermen Association

Thomas S. Hopkins
Dept. of Biology, University of West Florida

INTRODUCTION

In northwest Florida the effects of water pollution have been most pronounced in the lower Escambia River and its estuarine link to the Gulf of Mexico, Escambia Bay. Since 1967, Escambia Bay and many of its connecting bayous and backwaters have been exposed to numerous massive fish kills that have occurred regularly during the late summer and fall months (refs. 1). The causes of the degraded water quality conditions in the bay are not atypical in that they originate from a wide variety of man-produced discharges including industrial waste, municipal sewage, septic tank seepage, street and development drainage, dredging byproducts, and agricultural runoff. Though many of these sources are concentrated in the urbanized Escambia Bay area, additional contributions are received from the Escambia River proper and its drainage basin which extends northward from Pensacola, Florida to the Alabama border, and then northeastward across Alabama via the Conecuh River system.

At the time this study was initiated, it was a well established fact that the cumulative effect of these pollutants had been the serious degradation of the Escambia Bay sports fishery relative to marine and brackish-water game fishes. Commercial fishing operations, particularly those involving shrimp, were at a near standstill. Furthermore, it was the opinion of many local sports fishermen that the related fresh-water sports fishery in the tidewater sections of the Escambia River proper had also suffered to a considerable extent from pollution. Though some indirect evidence was available to indirectly support this contention (refs. 2 and 3), few quantitative data were available to describe the actual yield status of the Escambia River sports fishery.

In this light, it was decided to enlist the cooperation of local sports fishermen in the conduct of a comprehensive survey of the creel produced in the tidewater sections of the lower Escambia River. The basic objective was to design and implement a creel census that would evaluate the population status of the sports fishery in terms of the "catch-per-unit-of-fishing-effort" obtained by the sports fishermen who routinely fish this section of the river. An equally important objective was to structure the creel census in such a form that the current results could serve as a baseline measurement reference for evaluation of the results of similar surveys that would occur, hopefully, in the future.

This latter objective is made difficult by the fact that though the sports fisherman's yield is an indirect measure of the game fish population of the fishery, changes in the yield that may be detected by future creel surveys may not necessarily reflect a corresponding change in the fish population. For example, in the future it is quite possible that a greater number of fishermen may become more knowledgeable of the best fishing spots within the river system. An increase in their yield could result even though the fish population remained constant. In contradistinction, if fishing pressure increased to a marginal level as a result of a significant rise in the number of sports fishermen, it is conceivable that the yield might decline even though the fish population might be on the increase.

Because of this difficulty in differentiating between the contribution of the fish population and the contribution of fisherman characteristics to the yield measured by such a creel census, considerable attention was given to collecting census data that would delineate the basic fishing habits of the participating sports fishermen.

To average out the day-to-day variations in yield that occur as a result of weather changes and tidal effects, the survey was scheduled on a three-month longitudinal basis. Furthermore, to gain a measure of the yield under maximum fishing pressure conditions, the three-month survey period was scheduled during the spring spawning season when both fishermen activity and fishing conditions reach their peak levels.

PROCEDURE

Since the survey was to be conducted on a complete volunteer basis, special attention was given to the problem of gaining the sustained support of the participating fishermen over the rather extended survey period. In this direction, the data collection task was assigned to the Bream Fishermen Association, a local fishing and hunting conservation organization. Because of this organization's previous work in alerting the community to its pollution problems, its sportsmen members were readily able to gain the full cooperation of the Escambia River fishermen. To strengthen rapport with the fishing public, advance publicity as to the objectives of the creel census was prepared and distributed to the local news media. Posters describing the census were also prepared and displayed in numerous fish camps, tackle shops, and related sporting goods stores.

A further point relative to the volunteer basis of the survey involved the realization that, in general, the returning fishermen would be tired and in a hurry to trailer their boat after a full day of fishing. Accordingly, emphasis was placed on minimizing the total amount of data collection time required of each returning fishing party. In this direction, a simplified questionnaire was prepared for collection of the census data. As shown in Appendix A, one side of the questionnaire listed the basic information to be entered. Data requested included the number of fishermen in the given fishing party, the total number of hours spent fishing by the party, the total number of fishes caught according to species, the approximate length of thelargest fish caught within each species classification, and information as to the various locations within the river system that the party fished during the given trip.

To assist in securing the location data, a map of the river was printed on the reverse side of the questionnaire. As shown in Appendix A, the survey region extended northward from the mouth of the Escambia River to its junction with the Delaney River near the township of Molino, Florida. This region provides area fishermen with over 80 miles of fishing waters with a surface area considerably greater than 1000 acres. A grid superimposed on the map divided the area into 35 one-square-mile subregions that were individually identified by a numerical symbol. This division of the survey region into the rather large one-square-mile areas was selected in the belief that any further subdivision might discourage some fishermen from revealing where they had fished. That is, it was felt that the identification of fishing areas of this size would not give a cautious fishermen the impression that the intent of the creel census was to uncover his "secret fishing hole." As indicated by the questionnaire, the fishing parties were requested to list by map number all areas that they had fished within during the given trip. In addition, they were asked to identify separately those listed areas where they did not catch any fish.

To initiate the survey, questionnaires were distributed to each of the fish camps within the survey region and the related fish camp operators given a complete briefing on the project objectives. To assist the fishermen in the completion of the questionnaire, members of the Bream Fishermen Association were onhand at each of the major fish camps from dawn to dusk throughout each weekend of the three-month survey period. These individuals distributed the survey forms to departing fishermen and, upon their return, assisted in the count and identification of the catch.

RESULTS AND DISCUSSION

The survey program resulted in the collection of creel data that described the catch produced by 1,234 different fishing trips that occurred on the lower Escambia River during April, May, and June of 1970. Taking into account the number of fishermen involved in each of these 1,234 fishing parties, the over-all creel was produced by a total of 2,558 sports fishermen. Since some of the fishermen made two or more trips during the survey period, the total number of individual fishermen who participated in the survey was less than this total. These fishing parties spent a total of 6,912 hours fishing on the Escambia River and produced a total creel of 13,210 fish. In terms of the time spent fishing by the individual fishermen, this creel was produced by a total fishing effort of 14,231 manhours.

BACKGROUND INFORMATION ON THE BASIC ANGLING TECHNIQUES OF THE FISHERMEN

The hook-and-line methods used by the Escambia River fishermen follow, in general, those practiced throughout the southeastern section of the country. That is, either natural or artificial baits are presented with some form of spin-casting, bait-casting, fly-casting, or cane pole type fishing outfit. During the period of this survey, the most commonly used live natural bait was the earthworm (local names for the most popular species included wigglers, redworms, and "earthworms"). Other live bait offerings included crickets, catalpa worms, oak worms, bait minnows, and shrimp. In the case of artificial baits, the most commonly used lure was a feathered popping bug followed by the conventional line of floating and sinking type cast-and-retrieve lures. Though not validated, it was a general observation that the majority of the survey fishermen used one or more forms of live natural bait in conjunction with one or more cane-pole type fishing rigs to produce their creel. A further point concerns the rather extensive flood plains that bound both sides of the Escambia River in the survey region. Since these flood plains limit access to the river, the contribution of bank or shore-based fishermen to the over-all creel was negligible. In effect, the creel was produced by individuals fishing from small, outboard-motor powered, fishing boats.

NUMBER, SPECIES, AND WEIGHT OF FISH CAUGHT BY PARTICIPATING FISHERMEN

The names of the principal species of fish caught during the survey, and their relative incidence expressed as a percentage of the total catch of 13,210 fish, are shown in Table I. Though the tidewater section of the Escambia River supports many different families of fresh-water and brackish water fishes (ref. 4), the survey data (the left-hand column of numbers in Table I) show that the Centrarchidae family of sunfishes was by far the predominant element of the sports fisherman's creel. The most common member of this family that was caught was the bluegill (44.8 percent of the total catch), followed by the redear sunfish (29.1 percent), the spotted sunfish (7.7 percent), the largemouth bass (7.5 percent), and the warmouth (2.8 percent). In total, these members of the Centrarchidae family accounted for 91.9 percent of the total catch. The "other species" listing in this table includes striped mullet, flounder, sheepshead, American eel, pumpkinseed sunfish, and assorted croakers.

To gain some insight into the average weight of the fish caught during the census period, weigh-in stations were setup at two fish camps (Smith's Camp and Beck's Lake Camp) on three successive weekends. A total of 1,193 were weighed during this period representing a 9 percent sample of the total number of fish caught. The total weight of this sample was 248 pounds giving an approximate mean weight of 0.23 pounds per fish. Using this mean weight as an extrapolation reference, it can be estimated that the total weight of the entire creel of 13,210 fish was approximately 2,750 pounds.

TABLE I

Species and number of fish caught by Escambia River sports fishermen compared to the species and number of fish collected by the electroshock method in the Little White section of the Escambia River. Number expressed as the percentage of the total catch.

SPECIES			CENSUS CREEL RESULTS	ELECTROSHOCK RESULTS *
SCIENTIFIC NAME	COMMON NAME	LOCAL NAME	PERCENT OF 13,210 FISH	PERCENT OF 950 FISH
Lepomis macrochirus	Bluegill sunfish	Bream	44.8	36.1
Lepomis microlophus	Redear sunfish	Shellcracker	29.1	18.6
Lepomis punctatus	Spotted sunfish	Stumpknocker	7.7	10.6
Micropterus salmoides	Largemouth bass	Green trout	7.5	17.8
Chaenobryttus coronarius	Warmouth	Goggle eye	2.8	1.7
Ictaluridae	Catfish family	----------	2.0	0.4
Pomoxis nigromaculatus	Black crappie	Speckled perch	1.1	0.3
Amia calva	Bowfin	Grinnel	0.3	2.3
Lepisosteidae	Gar family	----------	0.2	3.6
Esox niger	Chain pickerel	Jack fish	0.1	0.1
Other species	----------	----------	4.4	8.4
			100.0	99.9

* Date collected by Florida Game and Fresh Water Fish Commission using AC electroshock method on the Little White River. A total of 950 fish were collected as a result of nine separate samplings that occurred during the fall of 1970 and the spring of 1971 (ref. 5).

COMPARISON OF CREEL CENSUS DATA TO ELECTROSHOCK COLLECTION DATA

Throughout the country, fish biologists often use the electroshock method of collecting fish for evaluation of the productivity and population status of fresh-water sports fisheries. When capture-mark-recapture statistical techniques are applied in conjunction with this collection method to a given fish species of a given size, a valid measure of the population of this specific species classification results. Because of the considerable amount of time and expense involved in these mark-type population studies, it is sometimes an economic necessity to bypass the marking procedure and utilize the raw data, e.g., the number and size of each species caught, to arrive at an estimate of the productivity of the sports fishery. In this case, it is important to establish some quantitative relationship between the species distribution of the game fish recovered by the electroshock method and the species distribution of the game fish actually present in the sports fisherman's creel.

Fortunately, some quantified insight into this matter can be gained for the creel census region as a result of a comprehensive capture-mark-recapture study (ref. 5) conducted by fish biologist members of the Florida Game and Fresh Water Fish Commission in the Little White section (Area 26 on the map presented in Appendix A) of the lower Escambia River. This study, implemented in the fall of 1970 and the spring of 1971, utilized a 240 VAC alternator to power two water-immersed cable-type electrodes attached to the bow of a work boat. Using this specific electroshock technique, a total of 950 fish were collected as a result of nine different three-hour electrofishing sessions in the denoted area.

The percent distribution of the various species of fish caught in this electroshock study are shown to the right of the corresponding creel data in Table I. It is obvious that the species distribution produced by the sports fishermen differs from that produced by the electroshock method. This would be expected in part since the electroshock method is far less selective than the hook-and-line method. There is a general correlation, however, in that the top four species caught by the sports fishermen corresponds to the top four species recovered by electroshock. The bluegill, redear sunfish, spotted sunfish, and largemouth bass accounted for approximately 89 percent of the creel census data and 83 percent of the electroshock data. An attendant discrepancy, however, involves the relative incidence of the largemouth bass. For this specific four-species subpopulation, largemouth bass represented 8.4 percent of the fish caught by fishermen and 21.4 percent of the fish caught by electroshock. In effect, the electroshock method indicated a largemouth bass incidence that was 2.5 times greater than the incidence indicated by the creel data. Even when one takes into account the total number of fish of all species caught by the two methods, the electroshock measure of bass population is still 2.4 times that actually yielded to the sports fishermen. It is reasonable to consider that this discrepancy might be due in part to the fact that the creel census data were derived from an area much larger than that where the electroshock data were collected. However, an analysis of the creel census data collected in the electroshock region (Area 26) shows a bass incidence, relative to the total number of fish caught, of only 6.3 percent.

THE YIELD OF THE LOWER ESCAMBIA RIVER SPORTS FISHERY

Because of variations in the amount of time different fishermen actually spend fishing, it is convention to measure the yield of a sports fishery in terms of the catch-per-unit-of-fishing effort. In the case of this creel census, fishing effort for a given trip is represented by the number of manhours spent fishing. This manhour figure was calculated for each of the 1,234 trips by multiplying the number of fishermen in the given party by the total amount of time the party spent fishing. These calculations showed that Escambia River fishermen who participated in the survey expended a total fishing effort of 14,231 manhours.

Though the over-all yield could be expressed simply as the total number of fish caught during the survey divided by the total number of manhours spent fishing, the resulting figure would be relatively meaningless because of the wide variations that exist in the skills or, more kindly, luck of the individual sports fishermen. For this reason, the yield for each of the 1,234 trips was calculated by dividing the number of manhours spent fishing into the total number of fish caught during the given trip. A plot of these individual yield data is presented in histogram form in Figure 1. This figure shows the number of fishing trips, expressed as a percentage of the total of 1,234 trips, that produced the denoted yield in 0.2 fish-per-manhour increments. The considerable variation in yield and the nonsymmetrical distribution are quite obvious.

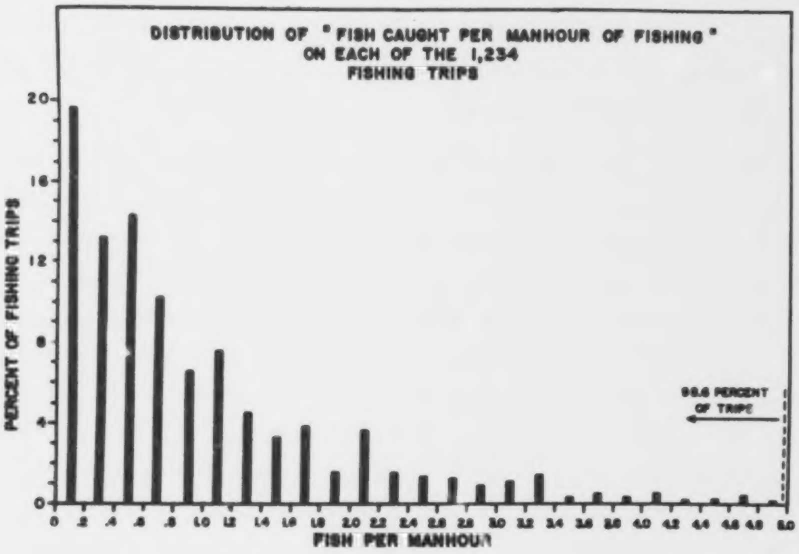

Figure 1.

Frequency distribution showing the relative incidence of a given yield for the 1,234 different fishing trips recorded by the 1970 creel census of the lower Escambia River sports fishery. Note the nonsymmetrical nature of the distribution.

These same individual yield data, with the exception that the yield increment is 0.1 fish-per-manhour, are shown plotted in cumulative distribution form in Figure 2. These data indicate that the median yield for the Escambia River sports fishery was slightly greater than 0.6 fish-per-manhour. The 75 percent and 25 percent quartiles were approximately 1.3 and 0.3 fish-per-manhour, respectively. The yield at the 75 percent quartile (denoting the most successful fishing parties) was twice the yield at the median level and over four times greater than the yield at the 25 percent quartile (denoting the least successful fishing parties). Expressed in sports fisherman language, the "average Escambia River fisherman" required approximately 1.7 hours of fishing time to catch each fish in his creel. Average in the median sense denotes that fisherman who had a yield that was greater than the yield of the least successful 50 percent of the fishermen and less than the yield of the most successful 50 percent of the fishermen.

These variations in yield are similarly expressed by the cumulative distribution plot presented in Figure 3. These data were obtained by making a frequency count of the number of fish that were caught on each of the 1,234 fishing trips. This distribution indicates that the least successful half of the fishing parties caught only 12 percent of the fish while the most successful half caught 88 percent of the fish. In terms of the upper and lower quartiles, 25 percent of the fishing parties caught 65 percent of the total creel while the lower 25 percent caught only 2 percent of the creel. It should be observed also that over 11 percent of the fishing parties did not catch any fish at all.

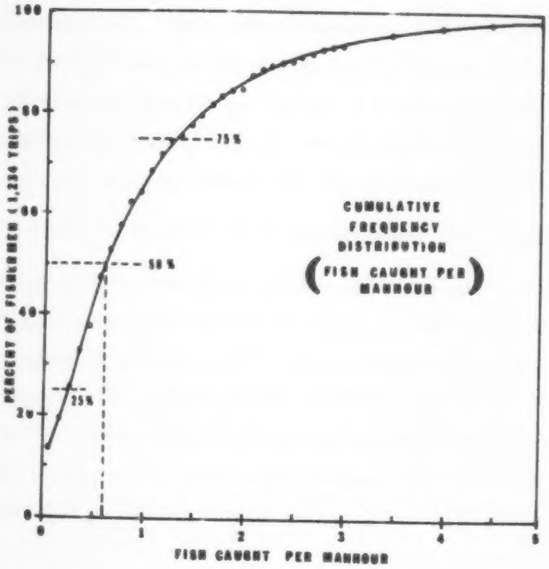

Figure 2.

Cumulative frequency distribution of the yield produced by the 1,234 fishing trips based on a 0.1 fish-per-manhour increment. The median yield was 0.6 fish-per-manhour. The upper and lower quartiles were 1.3 and 0.3 fish-per-manhour, respectively.

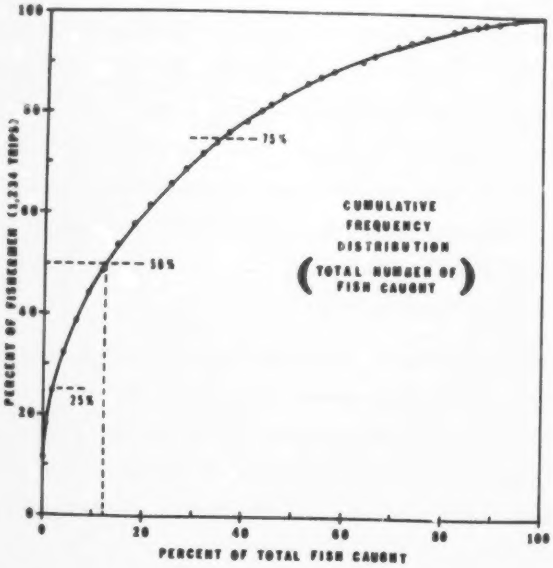

Figure 3.

Cumulative frequency distribution of relative number of fish caught by the 1,234 fishing parties. These data show that the least successful 50 percent of the fishing parties caught only 12 percent of the total creel of 13,210. Similarly, the upper 25 percent of the parties caught 65 percent of the fish while the lower 25 percent caught only 2 percent of the creel. Note that over 11 percent of the fishing parties caught nothing whatsoever.

A further interpretation of the 0.6 fish-per-manhour median yield of the Escambia River sports fishery can be made by using a mean weight estimate of 0.23 pounds-per-fish as a measurement reference. Combining the median catch datum with this mean weight figure results in a weight yield estimated to be 0.14 pounds of fish-per-manhour. In this context, the median fisherman was required to spend approximately 7 hours of fishing time on the Escambia River in order to produce a creel with a gross weight of one pound.

VARIATIONS IN YIELD AND SPECIES DISTRIBUTION AS A FUNCTION OF LOCATION

A secondary objective of this survey was to derive some insight into possible geographical variations in the yield and species distribution within the survey period. As mentioned previously this objective was approached by asking each fishing party to list each area within which they fished as identified in grid fashion by the map shown in Appendix A. Since it would have been impractical to have each fishing party guess at the actual time they spent fishing in each listed area, this time was estimated on the assumption that each area was fished an equal amount of time. Though this assumption would not be valid for all trips, it was felt that the considerable size of the sample would tend to average out individual trip variations. Hence, the amount of time spent fishing in a given area was calculated by dividing the total number of areas the fishing party stated they had fished into the total number of fishing manhours expended on the trip. Also, an estimate of the number of fish caught in each area was calculated by dividing the total number of areas that the fishing party had indirectly stated produced fish into the total number of fish caught on the trip. The resulting fish-per-manhour yield was then calculated on an individual area basis for each of the 1,234 different fishing trips.

For the creel associated with a given area to be included in the statistics that follow, 100 manhours was arbitrarily selected as a minimum fishing effort. With this qualification, summary statistics became available for 23 of the 35 different one-square-mile fishing regions included in the survey. Those areas not reported upon include area 1 through 10 at the northern boundary of the survey region and areas 20 and 28. As base-line reference for future Escambia River creel surveys, a plot of the manhours of fishing time calculated for each of these 23 areas is shown in Figure 4. These data indicate that fishing pressure was greatest in area 25 (Governors Bayou), area 14 (Becks Lake), area 30 (western section of Saltzman Bayou), and areas 34 and 35 (river marshlands near the mouth of the Escambia River).

In Figure 5, a plot is made of the average duration in manhours of the trips made to each of the 23 regions. This average was calculated by dividing the total number of trips made into a given area by the total number of manhours spent fishing in the area. Note that trip durations were of maximum length in areas 12, 13, and 14. The calculated median yield in fish-per-manhour produced in each of these areas is shown in Figure 6. These data indicate that, except for area 29 (Thompsons Bayou), the yield was greatest in that portion of the northern end of the survey region defined by areas 11, 12, 13, and 15.

To investigate any differences present in species distribution as a function of geographical location, the mean (not median) yield was separately calculated for the three most popular gamefish, i.e., the bluegill, the redear sunfish (shellcracker), and the largemouth bass. These data are plotted in Figures 7 through 9. The bluegill data of Figure 7 indicates that, in general, the yield for this species improves as one moves northward away from the river mouth. For the redear sunfish data shown in Figure 8, the opposite conclusion is

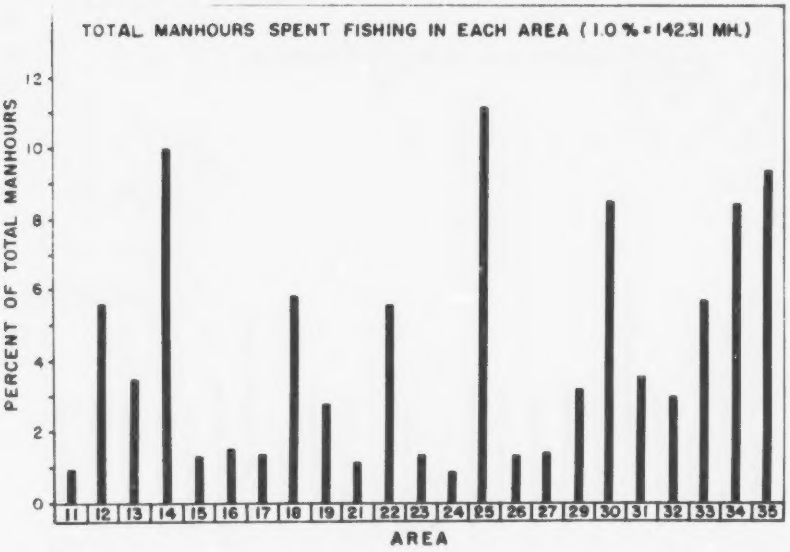

Figure 4.

Total number of manhours spent fishing in the denoted areas (see map in Appendix A for location of these areas). Fishing pressure was greatest in Governors Bayou (area 25) and near Becks Lake (area 14).

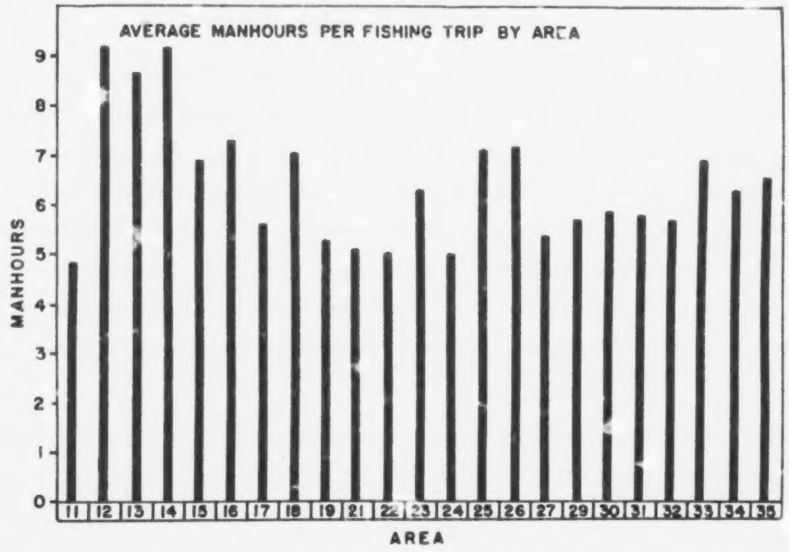

Figure 5.

Mean amount of fishing effort expended in each of the study areas. Effort was greatest in areas 12, 13, and 14 toward the northern end of the survey region.

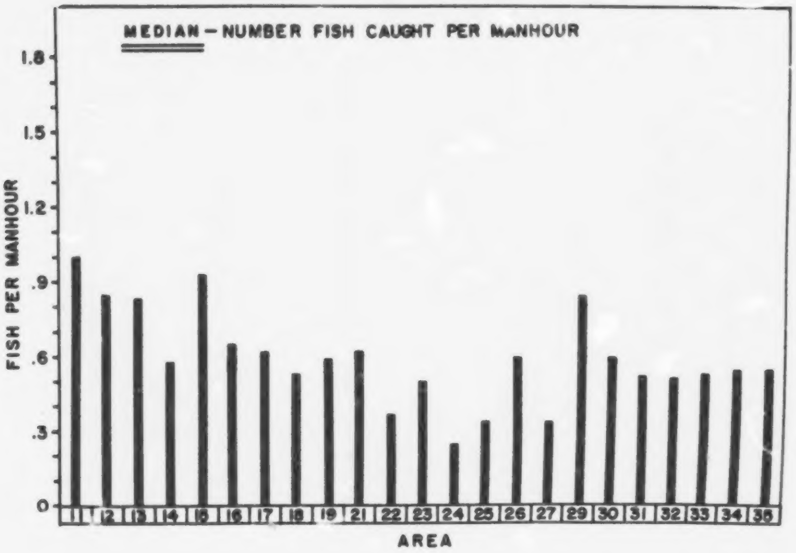

Figure 6.

Median yield as a function of fishing area. Except for area 29 (Thompsons Bayou), the yield was greatest in the northern section defined by areas 11, 12, 13, and 15.

reached since the yield tends to increase near the river mouth. However, the change in yield as a function of location is not as pronounced as that observed for the bluegill. The high yield present in area 29 (Thompsons Bayou) is interesting in that this body was permanently closed to fishing the year before the survey was initiated as a result of its acquisition by the University of West Florida for fish and game refuge purposes. Because of an impending hurricane late in 1969, the "No Fishing" signs posted at the mouth of this bayou were removed. When this creel census was initiated, the sign had not yet been replaced and many fishermen inadvertently entered the area to fish the "Shellcracker beds" long-known to exist in the grassy regions of this Bayou. The yield data of Figure 8 raises the question as to whether or not this one-year closure led to this excellent yield in area 29.

The largemouth bass data shown in Figure 9 show a pronounced fall-off in yield at the northern end of the survey region. For regions 11 through 14, the yield was less than 0.04 bass-per-manhour. These data indicate that, on the average, it would require approximately 25 hours of fishing effort to catch a single largemouth bass. In Figure 10, a plot is made of bass incidence expressed as a percentage value of the total number of fish of all species caught within each area. These data also show a marked geographical difference in the bass population. One interpretation of these data might account for these differences by assuming that the river mouth region is an exceedingly productive bass fishery. However, it is well known locally that this section of the Escambia River, compared to other rivers in northwest Florida, is not at all an outstanding bass fishery.

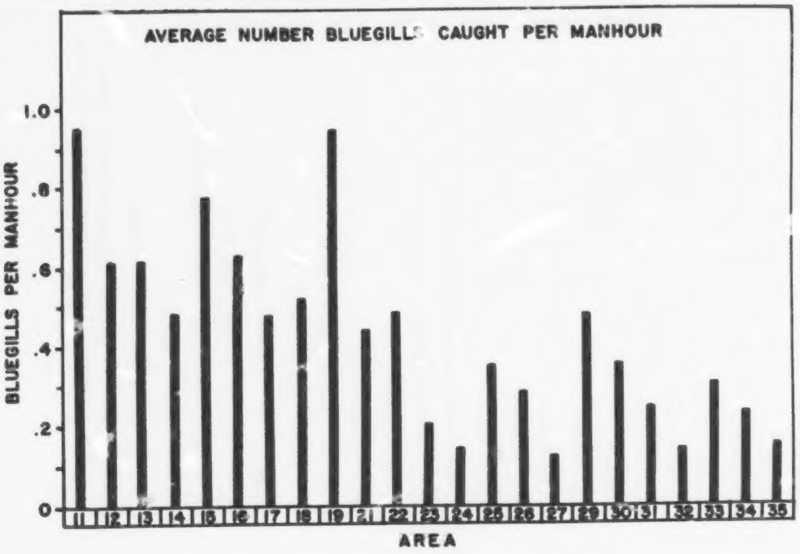

Figure 7.

Mean number of bluegill sunfish caught-per-manhour-of-fishing-effort as a function of location. The best yield was produced in areas 11 and 19. Note that the yield for this species increases as one moves northward away from the river mouth.

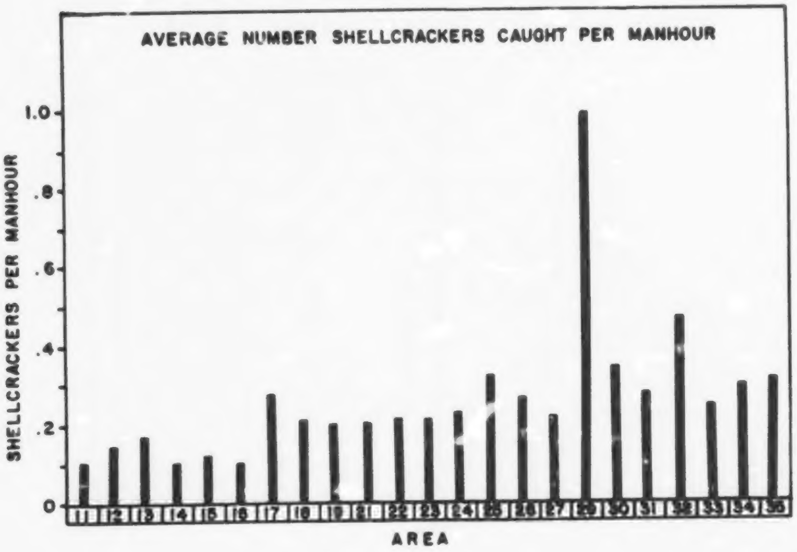

Figure 8.

Mean number of redear sunfish (Shellcracker) caught-per-manhour-of-fishing-effort as a function of location. The best yield was produced in Area 29 (Thompsons Bayou) which was theoretically closed to fishing. See text for explanation. Note that there is a slight increase in yield as one moves southward toward the mouth of the river.

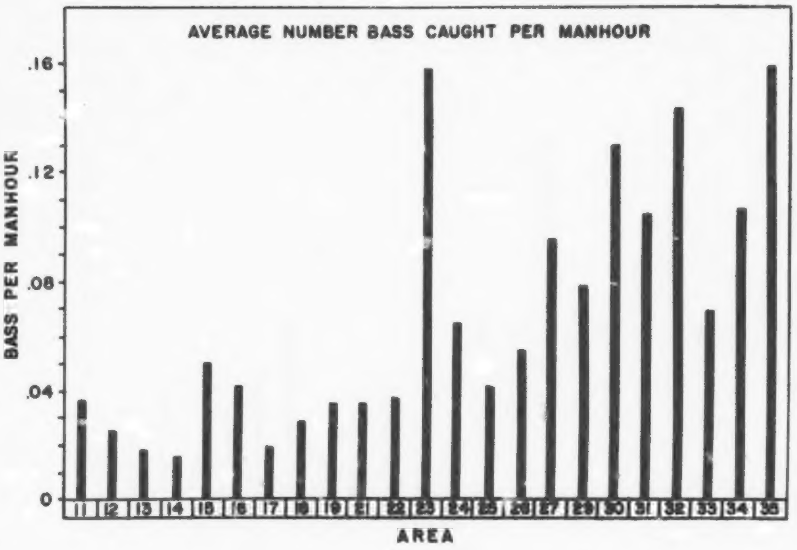

Figure 9.

Mean number of largemouth bass caught-per-manhour-of-fishing-effort as a function of location. The greatest yield was produced in areas 23 and 35. Note the decided decrease in yield for this species as one moves northward away from the mouth of the river.

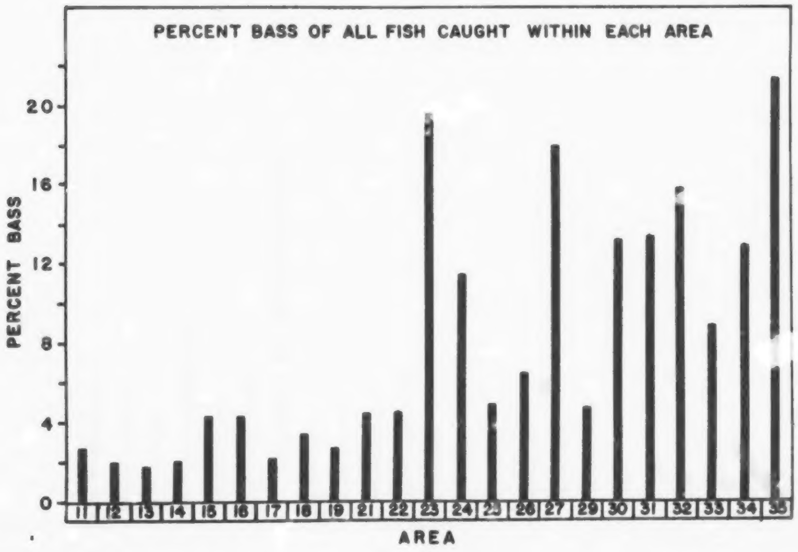

Figure 10.

Relative incidence of largemouth bass as a function of location. Incidence of this species is expressed as the percentage of the total number of fish caught in each area. These data also show a pronounced decrease as one moves northward away from the mouth of the river.

In this context, it is probable that the bass yield in the northern section of the survey region is considerably lower than what should be expected.

VARIATIONS IN YIELD AS A FUNCTION OF TRIP DURATION AND NUMBER OF FISHERMEN IN A GIVEN PARTY

In this section, data are presented which detail a few fisherman-related characteristics important to the evaluation of the yield results of future creel census programs that may be conducted on the Escambia River. A first point involves the individual differences in trip length and its effect on yield. Since the 1,234 parties spent a total of 6,912 hours fishing, the mean trip length was approximately 5.6 hours. To document the individual variations in trip length, a frequency count was made of the durations of the 1,234 trips. These data, based on one-hour increments, are plotted in Figure 11. The median trip length was found to be approximately 5.2 hours.

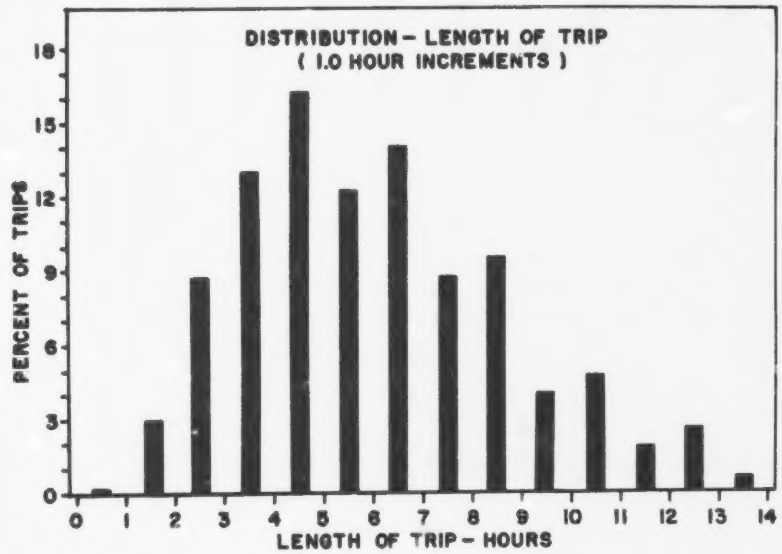

Figure 11.

Frequency distribution of the duration of the 1,234 fishing trips. The median trip length was 5.2 hours.

To determine the effect of trip duration on the yield of the trip, the yield data for the 1,234 trips were sorted according to the length of the trip in one-hour increments. The median number-of-fish-caught-per-manhour was then determined for each of these length classifications. These data, plotted in Figure 12, show that the greatest yield, approximately 0.8 fish-per-manhour, occurred for trip durations between 8 and 9 hours. The lowest yield resulted for trips of less than 4 hours duration. Since there was relatively little variation in yield for trip durations greater than 4 hours, it appears that trip length had little effect on the yield beyond this minimum time period. It should be noted, however, that though the yield does not increase with time, the sports fishermen who sustains his effort is rewarded the largest total catch.

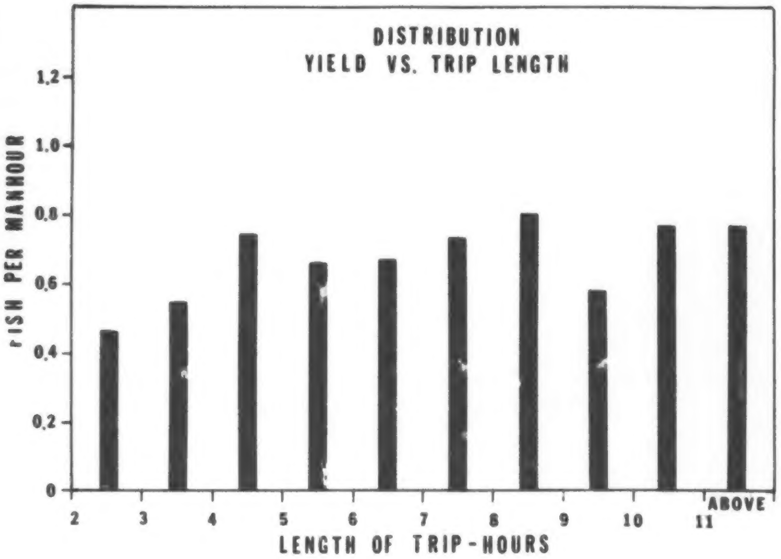

Figure 12.

Frequency distribution of the median yield in fish-per-manhour as a function of trip duration in one-hour increments. Note that there was a decrease in yield for trips of less than four-hours duration. However, for trips longer than four hours, there was little effect on yield as a function of duration.

Another variable in the habits of fishermen involves the total number of fishermen in a given fishing party. To investigate the effect of this factor on yield, the yield data for the 1,234 fishing trips was sorted according to the total number of fishermen in the party. The median yield in terms of fish-per-manhour was then separately determined for fishing parties involving one, two, and three fishermen. These data, listed at the left in Table II, indicate that the greatest success was achieved by the lone fisherman who produced 1.2 fish-per-manhour. However, if one ignores the number of fishermen in a given party, and calculates a new yield figure based on trip hours instead of manhours, a different conclusion is reached. This new yield figure, calculated by multiplying the basic yield figure by the number of fishermen in the party, is listed at the right in Table II for each size fishing party. For this measure of yield, i.e., fish-per-trip-hour, the two-fishermen party has a slight advantage. In general, however, these latter yield data show that the number of fishermen in a party has little effect on the trip yield. This finding should be of interest to sports fishery management in that if a measure is required of the total fishing pressure placed on a fishery by boat fishermen, a count of the total number of boats present, rather than a count of the total number of fishermen, would produce the best estimate.

TABLE II

Effect of the number of fishermen in a given fishing party on yield expressed as fish-per-manhour and fish-per-triphour.

Number of Fishermen in Fishing Party	Median Yield Fish-per-Manhour	Median Yield Fish-per-Triphour
1	1.2	1.2
2	0.6	1.2
3	0.5	1.0

OVER-ALL YIELD EXPRESSED AS A FUNCTION OF THE SIZE OF THE SPORTS FISHERY

To facilitate the comparison of the yield data produced by this study with yield data that may be available for other sports fisheries of different geographical size, a listing of the length and surface acreage of various waterways within the lower Escambia River basin is presented in Table III. The reference source for these data were three aerial photographs reporduced on single-weight photographic paper to a scale of approximately 1 to 18,000. To arrive at the surface acreage figures, each denoted waterway section was cut out of the aerial photographs with a scalpel. These cutouts, as well as reference cutouts of known area, were individually weighed on a Mettler Model S5 Analytical Balance. The resulting weight data were then converted to their acreage equivalent.

It should be noted that the data listed in Table III pertain to that section of the Escambia River system located south of Williams Ditch. As indicated by the map shown in Appendix A, this region corresponds to areas 11 through 35 of the creel study. The Table III data show that there are nearly 80 miles of fishing waters in this region. Since this table does not include acreage data for many of the smaller bodies of water within the survey region, it is estimated that these fishing waters have a minimum surface area of at least 1000 acres.

When these length and acreage data are combined with the total creel figure of 13,210 fish and the total estimated creel weight of 2,750 pounds, the following yield data result for the three-month survey period: In terms of the length of the fishing waters, the total catch in number was approximately 165 fish-per-mile; the estimated catch by weight was approximately 34 pounds-per-mile. On an acreage basis, the catch was approximately 13 fish-per-acrea; the estimated weight yield was approximately 3 pounds-per-acre.

An estimate of the yearly yield of the lower Escambia River sports fishery is made difficult by the fact that fishing pressure is not constant throughout the year. Following the spring season peak, fishermen activity falls off considerably during the hot summer months, decreases even further during the fall months, and is nearly nonexistent during the winter. This yearly estimate is further complicated in that the creel census data cannot be expected to account for every fish caught in the river system during the census period. For example, as data collectors were not present at the fish camps on weekdays, the return of completed questionnaires from weekday fishermen would be less than from weekend fishermen. However, several fish camp operators stated that 80 to 90 percent of their business occurred on weekends. Combining these offsetting factors, one may estimate that the creel census represents at least one-fourth the total yearly yield. Such an estimate is conservative in that it probably overestimates the yield of the fishery, if anything.

TABLE III

Estimated length and area of selected waterways in the Escambia River Creel Census Area

NAME OF WATERWAY	PORTION OF WATERWAY MEASURED	LENGTH (miles)	AREA (acres)
	MAIN RIVER		
Escambia River	Mouth to Highway 90 Causeway	1.5	72
Escambia River	Causeway to Thompsons Bayou	1.6	103
Escambia River	Thompsons Bayou to Gas Canal	2.6	104
Escambia River	Gas Canal to White River	5.0	100
Escambia River	White River to Williams Ditch	1.4	30
	Subtotal 1	12.1	410
	MAJOR TRIBUTARIES		
East River	Escambia River to Escambia Bay	1.6	46
Gum River	Escambia River to Escambia Bay	1.2	12
Sullivans Ditch	East River to Escambia Bay	1.0	19
Saltzmans Bayou	Escambia River to Causeway	2.7	23
Governors Bayou	Escambia River north to Escambia River	2.3	32
White River	Escambia River north to Escambia River	8.2	128
Little White River	White River south to junction with Xs	3.1	52
Big Simpson River	Causeway to White River	3.7	72
Xs Region	North of Causeway - all four prongs	7.4	131
	Subtotal 2	31.2	515
	BACKWATERS OF MAIN RIVER AND MAJOR TRIBUTARIES		
Escambia River	Mouth to Gas Canal	1.8	*
Escambia River	Gas Canal to Williams Ditch	7.3	*
East River	Near Escambia Bay	3.7	*
Saltzman Bayou	Along entire length	2.2	*
Big Simpson River	Including Woodbine and Bass Cove	4.0	*
Little Simpson River	Along entire length	1.9	*
Xs Region	Not including Coulters Basin	2.3	*
White River	Little White River north to Escambia River	5.6	*
Little White River	Along entire length	2.6	*
Governors Bayou	Shinney Bayou, Snake Creek, Clear Creek	2.0	*
Ferry Pass Bayou	Bayou proper	1.2	*
	Subtotal 3	34.6	
	GRAND TOTAL	77.9 miles	925 acres

* Surface acreage of these smaller waterways not measured.

Accordingly, the following rough estimates of the yearly yield are made: In terms of the length of the fishing waters within the survey region, it is estimated that the total catch by number during 1970 was approximately 330 fish-per-mile; the estimated catch by weight was 136 pounds-per-mile. In terms of acreage, it is estimated that the total catch by number was 52 fish-per-acre; the total weight yield was approximately 12 pounds-per-acre. These estimations can be interpreted to mean that current fishing pressure had a minimal effect on the population status of the Escambia River sports fishery.

SUMMARY

As a result of the excellent support given to the study by local sports fishermen, it became possible to conduct a comprehensive creel census for the lower Escambia River sports fishery and thus determine its yield status. The census was implemented in the spring of 1970 and covered the months of April, May, and June. The selection of the spring spawning season for the census was deliberate in that the best fishing conditions arise at this time of year and fisherman activity is at its peak.

The census resulted in the collection of creel data for 1,234 different fishing trips involving 2,558 fishermen. These fishermen expended a total fishing effort of 14,231 manhours to produce a creel of 13,210 fish. The predominant fish species caught included the bluegill (Bream) sunfish (44.8 percent), the redear (Shellcracker) sunfish (29.1 percent), the spotted (stumpknocker) sunfish (7.7 percent), and the largemouth bass (7.5 percent). A comparison of these creel data with similar species data collected by the Florida Game and Fresh Water Fish Commission using the electroshock method showed a similarity in the principal species of fish collected. However, in the case of the largemouth bass, the number collected by electroshock was over two times greater than the number actually yielded to the sports fisherman's creel.

The over-all yield for the Escambia River sports fishery was found to be approximately 0.6 fish-per-manhour-of-fishing effort. This median figure was bounded by a 75 percent quartile of 1.3 fish-per-manhour and a 25 percent quartile of 0.3 fish-per-manhour. The yield data also indicated that the least successful 50 percent of the fishermen caught only 12 percent of the total creel of 13,210 fish. Importantly, over 11 percent of the fishing parties did not catch any fish whatsoever. As a result of weigh-in data collected from a 9 percent sample of the creel, it was estimated that the total weight of the entire creel produced during the census period was only 2,750 pounds. These same data were used to arrive at a mean weight for the individual fish that was estimated to be 0.23 pounds. Using this mean weight as reference, the weight yield of the Escambia River sports fishery was calculated to be 0.14 pounds-of-fish-per-manhour-of-fishing-effort.

The creel census data also showed marked differences in yield for different species as a function of the location of the fishing area. The best yield for the bluegill was found to occur toward the northern boundary of the tidewater survey region. In contradistinction, the best yield for the redear sunfish and the largemouth bass was found to occur near the mouth of the Escambia River. Most noticeable was the low yield of bass, less than 0.04 fish-per-manhour, produced in the northern section of the river.

An analysis of certain fishermen-related data indicated that the median trip length was 5.2 hours. These data also indicated that the yield fell off if the trip duration was less than four hours. However, though there was a greater yield for trips of longer duration, there appeared to be no great difference in yield for trip durations beyond the 5.2 hour-median. The census data also showed that though the yield for the lone fishermen was greater than the yield for fishing parties of larger size, the number-of-fish-caught-per-trip hour (not manhour) was relatively independent of the size of the fishing party.

Using the median yield data, the mean estimated fish weight data, and the median trip length data in combination results in the following description of a typical Escambia River fishing party during the creel census period. The median or "average" fishing party consisted of two sports fishermen who spent a total of 5.2

hours fishing on the Escambia River. Since the median yield was 0.6 fish-per-manhour, each of these sports fishermen would have a total catch of three fish. Using the estimated average weight of 0.23 pounds-per-fish as reference, it could be predicted that the total weight of these three fish would, on the average, not exceed 0.7 pounds.

In conclusion, it is felt that this survey fully accomplished its objectives relative to establishing a base-line reference for evaluating any changes in the yield of the Escambia River sports fishery that may be detected by future creel census programs. Furthermore, in the opinion of the authors, the creel data proper document the contention of local sports fishermen that pollution has indeed adversely affected the tidewater sections of the Escambia River sports fishery.

LIST OF REFERENCES

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2. Tisdale, W. E., Report of Investigations Into Pollution of Pensacola Area Waters. Pensacola, Fla.: Northwest Regional Office, Bureau of Sanitary Engineering, Florida State Board of Health, 19 May 1969.

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APPENDIX A

QUESTIONNAIRE FORM USED FOR COLLECTION OF CREEL CENSUS DATA

BREAM FISHERMEN ASSOCIATION
B
F
A
SUPPORT CONSERVATION

QUESTIONNAIRE PROPER

UWF-BFA ESCAMBIA RIVER FISHING SURVEY

CONDUCTED BY YOUR BREAM FISHERMEN ASSOCIATION FOR THE UNIVERSITY OF WEST FLORIDA

ATTENTION FISHERMEN

This survey is being conducted by members of the local BREAM FISHERMEN ASSOCIATION on behalf of Dr. Tom Hopkins, Chairman of the Department of Biology, UNIVERSITY OF WEST FLORIDA. The information you supply will provide a baseline reference on the type and quality of fresh-water fishing in Escambia River. The information will be of immediate value to identifying those areas where FISH RESTOCKING is required. It will also be of value to the study of pollution effects in the Escambia River and the upper bay near the mouth. Remember, the survey is being conducted for and by local fishermen so help them/yourself by participating.

Date of this Fishing Trip ____________ Number of Fishermen in your party ________ Total number of hours fished ______

Look at the map on the back of this form and locate ALL the areas you fished in today regardless of whether or not you caught any fish. Write in the Map Number of every area fished. ____ ____ ____ ____ ____ ____ ____ ____

This is a KEY QUESTION. List the Map Numbers above where you did NOT catch fish. We repeat, List the Map Numbers of the locations where you fished but DID NOT catch fish. ____ ____ ____ ____ ____ ____ ____ ____

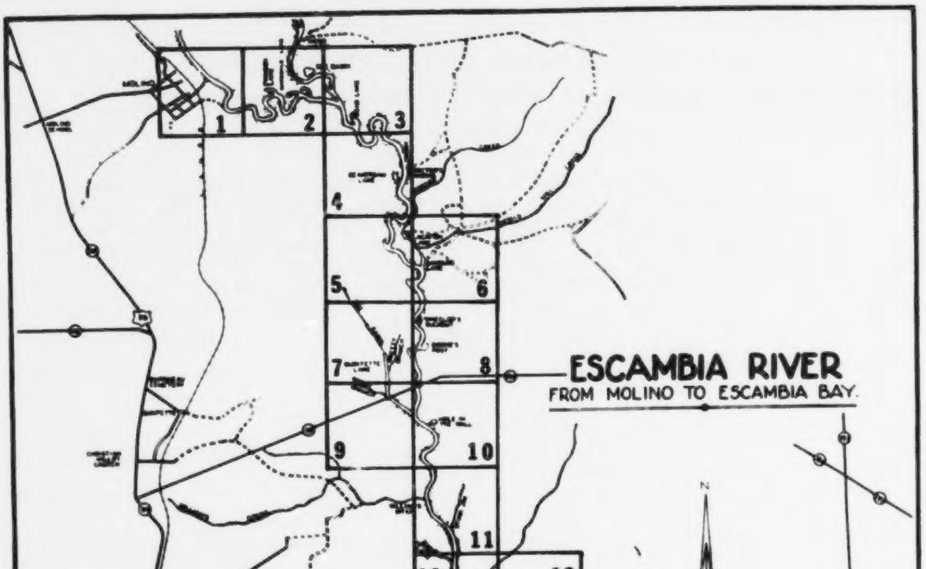
TYPE OF FISH YOU CAUGHT ON THIS TRIP	NUMBER FISH YOU CAUGHT OF EACH TYPE	LENGTH OF LARGEST FISH IN INCHES
LARGEMOUTH BASS (Green Trout)		
BLUEGILL (Bream)		
SHELL CRACKER (Redear Sunfish)		
STUMPKNOCKER (Spotted Sunfish)		
GOGGLE EYE (Warmouth)		
CRAPPIE (Speckled Perch)		
CHAIN PICKEREL (Jackfish)		
FRESHWATER CATFISH		
SALTWATER CATFISH		
GAR		
BOWFIN (Grindle, Cotton fish)		
SHAD		
OTHER TYPE FISH		

Name of Fish Camp you used:	If you have any suggestions on how to improve fishing in the Escambia-write in this space. Thank you.

IF YOU WOULD LIKE A FREE COPY OF THE SURVEY RESULTS WHEN FINISHED, FILL IN BELOW

Name	Mailing Address	Telephone No.

MAP OF SURVEY REGION PRINTED ON REVERSE SIDE OF QUESTIONNAIRE



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